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TORREYA

A Bi-Monthly Journal of Botanical Notes and News

John Torrey 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

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Plant records from southwestern New York

Irving William Knobloch

During the course of a season's botanizing in a very carefully botanized area of New York state, a small number of plants were turned up which had better be reported upon at this time. All published records of plant life in this area were examined and it is felt that the following plants will prove valid additions to our flora and in one case adds a new station for a well-beloved shrub.

Thelypteris spinulosa (O. F. Müll.) Nieuwl., the spinulose shield fern, is listed as "infrequent" in this area being known only from "Rock City" north of Salamanca. I have found it in two places this past summer in the Allegany State Park in Cattaraugus county thus adding two stations in this county. Near Rushford, in Allegany county, I found a single plant this summer. This appears to be the first record of this species from Allegany county. Mrs. Charles Congdon of Salamanca, N.Y., found a single plant near Chautauqua Lake some time ago, which appears to be the first reported record from Chautauqua county. Since there are few amateur botanists in this area familiar with the distinctive appearance of this species, it may be that it has been confused with the abundant variety *intermedium*. Dr. Edgar Wheery has passed upon the specimens in my possession.

The variety *fructuosa* of the above species, said to be a leafy form of the variety *intermedium* by some, was located by Mrs. Charles Congdon in the Allenberg Bog in Cattaraugus county. As can be imagined, it is a very attractive fern. I can find no record of its being found previously in New York state but it may have been. Mr. Charles Weatherby identified this specimen for me.

Polypodium virginianum L. forma *deltoideum* (Gilbert) Fernald was located in the region just west of Allegany State Park

in Cattaraugus county and was represented only by a single plant. It grew in a crevice of a block of Salamanca conglomerate rock. Mr. Charles Weatherby kindly identified this plant.

Many rare plants have been found by other botanists in the place called "Balsam Swamp" in the Allegany State Park, the only such area in the park. Last summer, I was able to add another rare plant, this species being in the nature of a plant freak. I refer to *Osmunda cinnamomea* L. forma *incisa* (J. W. Huntington) Gilbert which was determined by Mr. Weatherby. This is a startling form of a common fern in which the pinnules are greatly and irregularly incised. Some basal pinnules are greatly elongated in addition. One plant was found in fruit and the fertile frond was part fertile and part sterile or leafy. The latter plant is called forma *frondosa* (T. & G.) Britton.

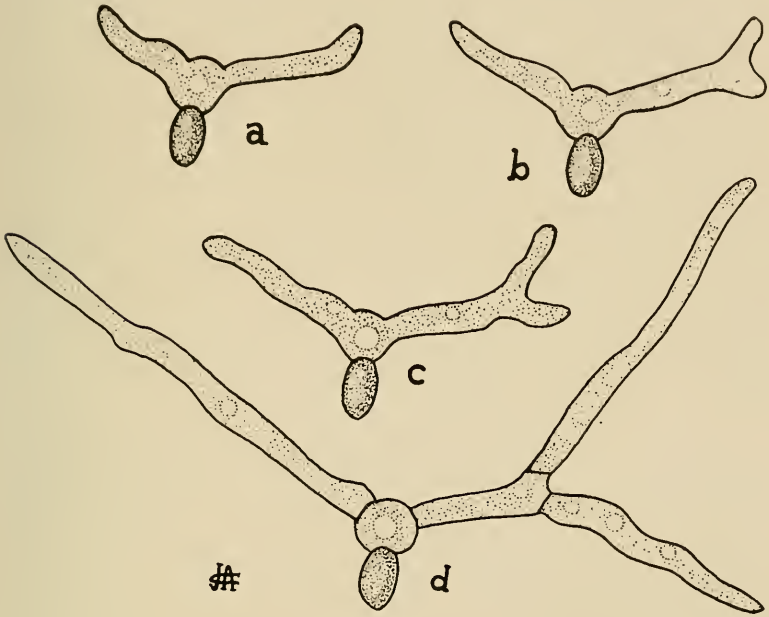
Rhododendron maximum L. is known from several places in Cattaraugus county. I am pleased to add another station to the all-too-few local stations. Last summer, following upon directions from one of the Senaca Indians on the nearby Allegheny reservation, I found a fairly large quantity of this plant in a swamp on the reservation near Red House, N.Y.

Buffalo, N.Y.

A plant suitable for classroom demonstration of growth

Const. J. Alexopoulos

During the progress of some growth studies on a species of *Anthostomella*, it occurred to the writer that this fungus might be of value for study and demonstration of rapid growth in elementary classes in Botany and Biology and that teachers engaged in this work might be interested in knowing the facts presented in this note.[1]



The particular species of *Anthostomella* under investigation, presumably a saprophyte, was isolated from diseased bark of Elm by Mr. H. H. Harris in 1932 and has been growing in pure culture since then.

This fungus makes a rapid growth on agar media at room temperature and may conveniently be used in the classroom for growth studies. Growth of the mycelium issuing from the ascospore is sufficiently rapid to enable the student to detect differences in length of the mycelial tubes under the microscope

[1] The writer will be glad to furnish a transfer of the organism to anyone interested, upon receipt of a sterile slant of nutrient agar.

every few minutes. The drawings presented in the accompanying figure represent different stages in the growth which has taken place on maltose agar during a period of two hours. The first drawing (a) was made at 8:45 p. m., the second (b) at 9:00 p. m., the third (c) at 9:15 p. m., and the fourth (d) at 10:45 p. m. Thus, during the usual two hour laboratory period a student is able to make several drawings of different stages of growth and to take measurements at regular intervals from which the rate of growth of this organism may be calculated. At the same time he is enabled to follow the formation of septa in the mycelium and to study such structures as vacuoles etc.

In connection with such classroom studies, it is well for the instructor supervising the work, to plant the ascospores to be studied on the agar plates, eight to twelve hours before observation is to begin, this being the time required usually for ascospore germination. When the first observation is about to be made, the Petri dish is uncovered and a thin cover-glass is placed on the surface of the agar covering the germinating ascospores. By following this procedure, studies can be made by the use of the high power objective of the microscope whereas without the cover glass, the lens, because of its proximity to the moist surface of the agar, will cloud very quickly.

Some of the other advantages of this fungus besides its rapid growth which make it very suitable for elementary studies are the following: The mycelial threads are stout, hyaline when young and brown when old. The septa are placed fairly close together and are sharply differentiated in the older brown mycelium. The fungus produces perithecia in abundance on the common laboratory agar media, the spores maturing about twenty days after inoculation. The perithecia are large, dark, and beaked. When these are crushed under a cover-glass, the numerous asci spread out, and the ascospores, because of their deep brown color, are sharply defined in their positions within the hyaline ascus. The ascospores are large, measuring 16–26μ in length and can be easily observed under the low power and studied under the ordinary 44$\times$ objective.

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Kent, Ohio

The introduced flora of Crater Lake National Park

F. Lyle Wynd

Previous to the year 1896, very few people had visited Crater Lake. This fact, together with its isolation from the main lines of travel, caused the flora of the immediate vicinity of the Lake to be almost entirely of native species.

In August, 1896, Frederick V. Coville spent seven days with the Mazama Mountain Climbing Club of Portland Oregon, botanizing the region. He published a list of his plants in Mazama Vol. I. No. 2, 1896. Speaking of *Rumex Acetosella* L., he says, "This, the only introduced plant seen at Crater Lake, was found sparingly near the upper camping place."

The localities studied by Coville and his collecting companion, John B. Leiberg, were the ravine of Pole Bridge Creek, along the road from this point to the Rim of Crater Lake, along the Rim as far east as a point midway between Applegate Peak and Castle Crest, as far west as the Watchman and Red Cone, down the outer slope of the crater south of the Watchman to the line of springs at its base, down Anna Creek about one and a quarter miles from the Rim, down the inner slope of the Crater to the water's edge, and on Wizard Island.

In the seven days between August 13 and August 20, it was not possible for him to make a complete survey, but the single introduced species noted above indicates that at that time very little change in the native flora had taken place.

The writer spent several summers in carrying out an intensive botanical survey of the Park. A number of introduced species was discovered. It is to be expected since about 150,000 people visit the Park each summer, most of them driving their cars from every part of the United States, that the number of accidentally introduced species would continually increase. The list which follows is complete for the introduced species to the end of 1930 in so far as the author's collections go.

Rumex Acetosella L. This very widely distributed weed was the first to establish itself at Crater Lake. It was first noted in 1896.

Chenopodium album L. This plant first came to Crater Lake in horse feed freighted in during the governmental construction

activities. It was copiously established about the horse barns near Park Headquarters in 1928.

Phleum pratense L. Imported horse feed probably first brought this grass. First noted in 1928.

Dactylis glomerata L. Like the preceding, probably introduced in imported horse feed. First noted in 1929.

Bromus inermis Leyss. Also probably introduced in horse feed. First noted in 1929.

Spergularia rubra (L). Presl. var. perennans (Greene) Robinson. There is some doubt concerning the nativity of this plant. Greene holds it to be a native of Europe, while Jepson maintains it to be a native of western America. At all events, it became well established about Park Headquarters in 1929.

Rumex crispus L. This is the latest newcomer to the Park. A solitary plant has grown for two seasons near the office buildings at Park Headquarters. At this altitude of 6600 feet, the very upper edge of the Canadian Life Zone is this latitude, it does not seem to set fertile seeds and will consequently soon become extinct. It was first seen in 1929.

Agropyron repens (L.) Beauv. A few plants of this species were found at the Lost Creek Ranger Station where horses had been tethered the previous year. First noted in 1929.

During 1930, an attempt to landscape the immediate vicinity of the Lodge was made. Grass seed of several species were sown. It is probable that future observations will show several species of grass and weeds introduced at that time.

Shaw School of Botany
St. Louis, Mo.

The type localities of some plants first described from West Virginia

Earl L. Core

In determining the exact usage of the scientific names of plants it frequently is of very great importance to know the exact locality of collection of the specimens upon which the species were established. Specimens from the type locality of a species might be expected to resemble the type much more closely than specimens collected in other localities. However, in the early days of taxonomy there was no definite concept of types and type localities. Botanists simply assigned to their new specimens large, indefinite areas such as "Virginia," "Carolina," or "Pennsylvania," which are still more vague today because of changes in the applications of the geographical names.

Standley (Contrib. U.S. Nat'l. Herb., 13: 143–227. 1910) has undertaken the preparation of a list of type localities of plants from New Mexico. In his list of 690 plants from that state, he calls attention to the much greater difficulty that would be encountered in such a compilation for one of the Eastern states because of the obstacles mentioned above.

The present paper has been prepared merely as an introduction to this problem. For the most part, the types enumerated here are comparatively recent, after the type concept has become well established. Designation of the type localities of the plants described by such early explorers of West Virginia as Michaux, Kin, Pursh, or Rafinesque would be very difficult, in many cases impossible. It is especially difficult to locate West Virginia stations in the field work of the early botanists from the fact that their labels often read simply "Virginia." Before 1784 Virginia extended indefinitely from the Atlantic coast to and beyond the Ohio River, while the boundaries of West Virginia were not established until 1863. Then, too, the country was so thinly settled and localities so uncertainly named that to ascribe definite geographic places to collected plants was impossible to the traveller. Further research, however, will doubtless add several names to this list.

White Sulphur Springs, in Greenbrier County, is remarkable for the number of plants described from that locality. The reason for this is that the well-known summer resort, often

visited by botanists, lies within the area of the shale barrens, which possess the most interesting portion of the state's flora, including many endemics. These have since been discovered in more remote districts, 100 miles or more from the original locality.

A number of varieties and forms of common plants were described by Dr. C. F. Millspaugh from Morgantown during the tenure of his stay there as Botanist of the Agricultural Experiment Station. The types of these plants are, for the most part, filed in the Herbarium of West Virginia University. A few appear to have been lost in the various vicissitudes to which the herbarium was exposed before it reached its present permanent quarters in Science Hall.

Under each species in the list, the author has attempted to give, usually quoted verbatim, the type locality, type number, date of collection, and any other important data. Where possible the accepted name for each species is given when the name listed has been found to be a synonym. Unless otherwise stated the name is to be taken as representing a good species.

Forty-five species, varieties and forms are here listed:

1. *Polypodium vulgare* forma *biserrata* Millsp., Prel. Cat. Fl. W. Va. p. 479, 1892. "A form found upon mossy boulders along the Blackwater Fork of Cheat; with regularly doubly-serrate divisions of the thinnish fronds," *Millspaugh.*
2. *Polypodium vulgare* var. *deceptum* Maxon, Proc. Nat. Mus., 23:628. 1901. "Type in the U.S. National Herbarium. Smithsonian Institution, collected by E. L. Morris, No 1215, on rocks along the Guyandotte River below Baileysville, Wyoming County., W. Va., Alt. 1100–1250., August 13–19, 1900. This fern has already been briefly characterized by Dr. Millspaugh as *Polypodium vulgare* forma *biserrata.* The name, biserratum being already preoccupied by a Mexican fern it becomes necessary, in referring to the West Virginia plant, to substitute a new name." (*P. virginianum* forma *acuminatum* (Gilbert) Fernald, Rhodora 24: 141. 1922, fide Wherry ms.).
3. *Polypodium virginianum* forma *cambricoides* F. W. Gray, Amer. Fern Journ. 14: 5. 1924. Rock ledges northeast of Peterstown, Monroe Co., *Gray.*
4. *Camptosorus rhizophyllus* forma *angustatus* F. W. Gray,

Amer. Fern Journ. 14: 11. 1924. Boulder in field near Alderson, Monroe Co., *Gray*.

5. *Asplenium Stotleri* Wherry, Amer. Fern Journ. 15: 52. 1925. Schist cliff on west bank of Shenandoah River, south of Keys Ferry, Jefferson Co., *Wherry*.
6. *Brachyelytrum aristosum* var. *glabratum* Vasey, MSS. Prel. Cat. Fl. W. Va. 469. 1892. "A new variety discovered by Mr. L. W. Nuttall. It agrees with the species except that it is perfectly smooth, and has an awn-pointed second glume which is about one-half the length of the flowering glume. Its most striking peculiarity is that it has invariably two culms from each root-stock. High rocky woods. Fayette, near Nuttallburg, rare."
7. *Agrostis alba vulgaris* forma *aristata* Millsp., Prel. Cat. Fl. W. Va. 469. 1892. "Damp meadow lands. Monongalia, along Falling Run," *Millspaugh*. 244. June 2, 1890. Type in Herbarium of West Virginia University. = A. canina L.
8. *Poa compressa* forma *depauperata* Millsp., Prel. Cat. Fl. W. Va. 472. 1892. "On rocks. Monongalia, along Falling Run, especially at the Cascade," *Millspaugh*.
9. *Panicularia nervata* forma *major* Millsp., Prel. Cat. Fl. W. Va. 473. 1892. "Monongalia: sand bars in Monongahela River near Little Falls," *Millspaugh*.
10. *Carex Muhlengergii* Schk. var. ———— Millsp., Prel. Cat. Fl. W. Va. 463. 1892. "Intermediate between type and var. *enervis* Bailey. Valley Bottoms, Cricard, Randolph Co.," *Millspaugh* 473. Type in Herbarium of West Virginia University.
11. *Carex fraseri* Andr., Bot. Rep. pl. 639. 1811. Described by Muhlenberg, (Desc. über Gram., etc., 265. 1817) under *C. lagopus?* Muhlenberg adds, "Habitat in Tyger-valley, Pennsylvania, eunde siccam habeo et vivam." Tygart's Valley lies completely in West Virginia and, to my knowledge, this plant has never been found in Pennsylvania. Original collection by Matthias Kin, about 1800; type in Berlin Botanic Garden.
12. *Allium oxyphilum* Wherry, Journ. Wash. Acad. Sci. 15: 370–372. 1925. Open woods along road $1\frac{1}{4}$ mi. west-northwest of Lillydale, Monroe Co., Type in United States National Herbarium, *Wherry*.

13. *Trillium erectum* var. *declinatum* Millsp., Prel. Cat. Fl. W. Va. 453. 1892. "Gilmer, near Glenville; Mason, near Point Pleasant; Jackson, near Ravenswood," *Millspaugh.*
14. *Eriogonum Alleni* Watson, in A. Gray, Man. Ed. 6, 734. 1890. "Near White Sulphur Springs, W. Va., *T. F. Allen.*" Type in Gray Herbarium, Harvard University.
15. *Polygonum persicaria* forma *albiflora* Millsp., Prel. Cat. Fl. W. Va. 342. 1892. "A pure white-flowered form abundant near Point Pleasant." *Millspaugh.*
16. *Syndesmon thalictroides* forma *rosea* Millsp. Prel. Cat. Fl. W. Va. 319. 1892. "A beautiful rose-colored clump of the species has persisted for two years. In Monongalia at Little Falls near the Cascade," *Millspaugh.*
17. *Clematis albicoma* Wherry, Journ. Wash. Acad. Sci. 21: 198. 1931. "*C. ovata* of current manuals, not Pursh. So far as recorded this plant was first collected on Kate's Mountain by Gustav Guttenberg in 1877. It differs from *C. ovata* in the respects enumerated in the key, and accordingly requires a new name, which is appropriately derived from its most unique character, the whitish hairs on the achene-appendages. It occurs on various shale-barrens; Kate's Mountain is taken as the type locality of the species, and as type specimen should be designated: Guttenberg, July 31, 1877. (U.S. Nat'l. Herb.). (*Viorna albicoma* Moldenke. Bull. Torr. Bot. Club 60: 57. 1933.)
18. *Delphinium tricorne* forma *albiflora* Millsp., Prel. Cat. Fl. W. Va. 322. 1892. "Monongalia: Prevalent near Stumptown. The flowers are pure white with no trace of blue," *Millspaugh*, May 9, 1892. Type in Herbarium of West Virginia University.
19. *Aconitum vaccarum* Rydb., Torreya 26: 31. pl. 1. 1926. "Type collected on the east slope of Spruce Knob, West Virginia, *P. A. Rydberg.* 9206. Herb. N.Y. Bot. Gard."
20. *Heuchera alba* Rydb., Torreya 26: 31. pl. 2. 1926. "Type collected on the northeast slope of Snowy Mountain, Pendleton County, West Virginia, opposite Simmons' farm, June 17, 1925, *P. A. Rydberg.* 9026. Herb. N.Y. Bot. Gard."
21. *Hydrangea arborescens* var. *Kanawhana* Millsp., Prel. Cat. Fl. W. Va. 363. 1892. "Along the Little Kanawha River from Kanawha Station to Glenville," *Millspaugh* 291, July

1, 1890. Type in Herbarium of West Virginia University.

22. *Spiraea virginiana* Britton, Bull. Torr. Bot. Club 17: 314 1890. "On damp rocks along the Monongahela River, Morgantown, West Virginia, collected by Dr. C. F. Millspaugh in flower, June 20, 1890, and in apparently imperfect fruit late in September." Type found in Herbarium of New York Botanical Garden.
23. *Rubus odoratus* var. *columbianus* Millsp., Prel. Cat. Fl. W. Va. 355. 1892. "Monongalia: cool woods, Tibbs Run," *Millspaugh*. (*R. columbianus* Rydb.). Type in Herbarium of the New York Botanical Garden.
24. *Rubus Millspaughii* Britton, Bull. Torr. Bot. Club 18: 356. 1891. "Near the summit of Point Mountain in Randolph County at an altitude of 3,500 ft., also along the Gandy in great profusion, *C. F. Millspaugh*." Type in Herbarium of the New York Botanical Garden.
25. *Trifolium virginicum* Small, Mem. Torr. Bot. Club 4: 112. tab. 75. 1894. "Growing on the rocky slopes of Kate's Mountain, Greenbrier County, W. Va., in company with *Clematis ovata* (*Small; Mackenzie; Heller* 843)." Type in Herbarium of the New York Botanical Garden.
26. *Chamaecrista nictitans commixta* Pollard & Maxon, Proc. Biol. Soc. Wash. 14: 163. 1901. "Collected by Charles L. Pollard and William R. Maxon in alluvial soil along New River at Quinnimont, Fayette Co., W. Va., August 21, 1899. Their No. 31, the type, is in the National Herbarium as No. 357,069." (*Cassia nictitans commixta* (Poll. & Max) Millsp. Liv. Fl. W. Va. 283. 1913).
27. *Polygala sanguinea* forma *albiflora* Millsp., Prel. Cat. Fl. W. Va. 333. 1892. "In the glades of Webster and Preston Counties," *Millspaugh* 554, July 15, 1890. Type in Herbarium of West Virginia University.
28. *Acalypha virginica* forma *intermedia* Millsp., Prel. Cat. W. Va. Fl. 436. 1892. "A form apparently uniting *A. virginica* L. with *A. caroliniana* Ell. especially in the matter of leaves and bracts, is found near Nuttallburg, and Hawk's Nest as well as along New River opposite Hinton," *Millspaugh*, 1114, Aug. 11, 1891. Type in Herbarium West Virginia University.
29. *Opuntia calcicola* Wherry, Journ. Wash. Acad. Sci. 16: 12.

fig. 1. 1926. "As the type locality may be designated an occurrence on the west side of the B. & O. R.R. tracks, a short distance north of Bolivar, Jefferson County, West Virginia. Type specimens, collected here on June 9, 1925, have been deposited in the U.S. National Herbarium (No. 1,242,156, type) and the New York Botanical Garden" *Wherry.*

30. *Ludwigia alternifolia* var. *linearifolia* Britton, Bull. Torr. Bot. Club 17: 315. 1890.
31. *Oenothera argillicola* Mackenzie, Torreya 4: 56. 1904. "Open sunny clay banks and along rivers, in loose rocky soil. Near White Sulphur Springs, August 27, 1903. *Mackenzie* 373." Type in Herbarium of New York Botanical Garden.
32. *Oenothera fruticosa* var. *differta* Millsp. Prel. Cat. W. Va. Fl. 366. 1892. "Damp meadows. Wood (County): near Lockhart's Run, the most common form," *Millspaugh* 286, July 1, 1890. Type in Herbarium of West Virginia University.
33. *Kneiffia longipedicellata* Small, Bull. Torr. Bot. Club 23: 178. 1896. "Moist places, Long Glade, Webster Co., W. Va., *Millspaugh* 579, July, 1890. (*Oenothera longipedicellata* Robinson, Rhodora 10: 34. 1908.) Type in the Herbarium of the New York Botanical Garden.
34. *Pseudotaenidia montana* Mackenzie, Torreya 3: 159. 1903. "In dry open woods, in a clayey soil intermixed with loose rocks. Side of Kate's Mountain, Greenbrier Co., August 29, 1903. *Mackenzie.*" Type in Herbarium of the New York Botanical Garden.
35. *Daucus carota* forma *rosea* Millsp., Prel. Cat. Fl. W. Va. 369. 1892. "With rose colored flowers, a frequent form in Monongalia, near Morgantown, and along the Kingwood Pike." *Millspaugh.* Type in the Herbarium of West Virginia University.
36. *Phlox Buckleyi* Wherry, Journ. Wash. Acad. Sci. 20: 26. 1930. "Type locality, White Sulphur Springs, Greenbrier County, West Virginia; type specimen collected by S. B. Buckley in June, 1838: in Herbarium of Missouri Botanical Garden."
37. *Phlox Brittonii* Small, Bull. Torr. Bot. Club 27: 279. 1900. "The specimens upon which the species is based were col-

lected by Dr. N. L. Britton at White Sulphur Springs, May 1898." (*P. subulata brittonii* Wherry, Bartonia 11: 27. 1929).

38. *Convolvulus Purshianus* Wherry, Proc. Penna. Acad. Sci. 7: 163. 1933. Ridge back of Sweet Springs, Monroe Co., *Wherry*.
39. *Scutellaria galericulata* forma *albiflora* Millsp., Prel. Cat. Fl. W. Va. 428, 1892. "Kanawha, near Charleston, *Barnes*." Type in Herb. of Wabash College.
40. *Houstonia caerulea* forma *albiflora* Millsp., Prel. Cat. Fl. W. Va. 375. 1892. "Grassy places, Permian formations, Monongalia, near Cassville." *Millspaugh*.
41. *Lobelia inflata* var. *simplex* Millsp., Prel. Cat. Fl. W. Va. 398. 1892. "Dry places. Randolph, near Cricard P.O. Characters of the species, but simple-stemmed," *Millspaugh* 483, July 11, 1890. Type in the Herbarium of West Virginia University.
42. *Vernonia maxima pubescens* Morris, Proc. Biol. Soc. Wash. 15: 25. 1901. "Collected among plants of the species along Hound Creek below Baileysville, Wyoming County, alt. 1100–1200 feet, August 20, 1900, *Morris* 1274. Type specimen is deposited in the U.S. National Herbarium."
43. *Antennaria propinqua* Greene, Brittonia 4: 83. 1899. "Collected only by E. L. Greene, on an open hillside at Harper's Ferry, May 14, 1898; only one large patch seen, and that male." Type in United States National Herbarium.
44. *Senecio antennariifolius* Britton, in Britt. and Brown, Ill. Fl. Ed. 1. 3: 478. 1898. "On loose slate hillside, near White Sulphur Springs, *Allen & Britton; Mackenzie*." Type in Herbarium of the New York Botanical Garden.
45. *Hieracium alleghaniense* Britton, Man. ed. 2. 905. 1905. "In the Alleghany Mountains near Aurora, Preston County, W. Va., August 29, 1898. *Mr. & Mrs. Steele*." Type in the Herbarium of the New York Botanical Garden.

West Virginia University
Morgantown, W. Va.

FIELD TRIPS OF THE CLUB

Trip of Sunday, October 6, to the North Edge of the Pine Barrens

With a cold fall rain making the day bleak, only four of the hardiest field hikers appeared at the Tinton Falls Inn for the pine barren trip. The Tinton Falls immediately back of the mill wash over an iron stone cliff about twelve feet high and on this exposed escarpment on the south side we found the Ebony Spleenwort and *Woodsia obtusa*, growing most luxuriantly. Immediately below were *Boltonia* and a species of *Coreopsis* both flowering freely despite hard frost the previous night which had killed jewelweed, bracken and most of the tenderer plants.

We proceeded down Pine Brook to a typical wooded area in the middle zone of New Jersey where other species of aster, goldenrod, large patches of closed gentian, feathery stalks of *Selaginella* and the last lingering blooms of *Coreopsis mariana* made bright patches of color. Here again the ferns were the principal attractions since both Mr. Fessenden and Mr. Jehlyn are fern fans. The Marsh fern, New York fern, Cinnamon fern and Crested Shield fern all abounded on the edge of the marsh. Both the Crested Shield fern and *Woodsia obtusa* being surprises for an area so near the pine barren conditions.

Along the foot of the wooded bluffs in better drained ground were all of the Intermediate forms of *Botrichium* ranging from the blunt leaved coarse type to the finely dissected form which is known as the species *dissectum*. A few of the plants were so vigorous as to carry two fruiting fronds instead of one. Fruits of both the jack-in-the-pulpit and the skunkcabbage were abundant. Trailing arbutus, holly and the mountain laurel all were particularly vigorous and healthy in the red sandy soil of the lower slopes. The forest growth was principally of red, black and chesnut oak, hemlocks and white pine with occasional white oaks, red maples and gum trees.

The evergreen shield fern, christmas fern and hayscented fern clothe the upper slopes in dense woodlands. The growth in this area in all respects is typical of that of the middle and northern part of New Jersey, the only species common in the Pine Barrens being in the open fields where *Andropogon*, *Lespedeza capitata* and sweet fern made low brush thickets.

After luncheon we proceeded southward and within three miles came to typical pine barren with *Ionoctis linearifolia*, *Aster spectabilis*, and *Solidago odora*, the most conspicuous flowers. In little sandy pockets of boggy ground the sphagnum was dotted with sundew, cranberry and the dried fruit stalks of *Utricularia*,—*Lycopodium Chapmanii* with its creeping stalk and upright straw colored fruiting branches making diminutive sentinels in these tiny patches of bog. On the higher ground pitch pine, scrub oak, black and post oak competed for the scanty nourishment in the white sand, the underbrush consisting almost entirely of sweet fern and sheep laurel with dried fronds of the eagle fern filling almost every open spot.

Then a trip of five miles westward brought us through an old cedar swamp with sweet bay, climbing azalea, *Pieris* and high bush huckleberry thickets to a particularly heavy tangle with sphagnum, pitch pine, cranberries and one large patch of the locally abundant climbing fern, *Lygodium palmatum*, as the principal attraction. This particular station for the climbing fern was reported by Rev. Samuel Lockwood about seventy years ago, relocated by the undersigned about thirty years ago and then left to its own devices until this fall. Meantime the size of the stand has apparently decreased due to encroachment of heavy thickets of maple and tall shrubs on what was originally low bushes and sphagnum bogs. Miss Wyckoff reported that a friend of hers has found the same species of climbing fern at still another station further east near Asbury Avenue, south of Scobyville. This would be a good place to search out in another trip as in that same general neighborhood the southern mistletoe has been gathered within the past generation and is probably still there, possibly constituting the most northern station still extant of this plant. Heavier showers of rain coming about three o'clock after we had gazed our fill on the climbing fern dampened our ardor for any further exploring that day.

Forman T. McLean

Field Trip of October 13

Twenty members and friends made the trip to the Delaware Water Gap. Colonies of three uncommon ferns were visited, the rusty woodsia (*Woodsia ilvensis*), mountain spleenwort

(*Asplenium montanum*), and hairy lip-fern (*Cheilanthes lanosa*). The region also proved a rich one for lichens.

S. Fred Wright

Field Trip of October 27

A warm day welcomed the group of six members and guests who made the trip to the Pine Barren region near Lakewood, N.J.

The painted landscape seemed to grow more intense in color as we progressed southward in the train. The red and brown of oaks and the yellow, orange and crimson of red maples were set off by the background of the ubiquitous pitch pines. Around New York City the climax of autumnal coloration had already passed but here it still presented a lovely warmth of color.

Our itinerary took us to Lake Carasaljo. We followed the shore of the lake along the south shore and then the stream which empties into it, later returning on the opposite side. A swamp to the right of the railroad was our first hunting ground. Many buttonball bushes were easily spotted by their rounded fruits, *Mikania scandens*, the climbing hempweed, overflowed the shrubs and herbs alike in clouds of feathery seeds. A stream disclosed abundant fruit of the pickerel weed, each containing many gelatinous coated seeds able to remain afloat all winter.

At the bottom of the railroad embankment the leader searched for the brilliant blue of the bottle gentian, *Gentiana Andrewsii*, which he had found while scouting the previous Sunday. Most of the petals had turned brown, but a few still showed color. Specimens of *Pycnanthemum virginianum*, a very strong scented mint, were bruised, as were also the leaves of *P. flexuosum*, both of which were eagerly sniffed by those present.

Along the shores of the lake we found the red berries of *Ilex verticillata*, and the shining red hips of the swamp rose, *Rosa caroliniata*. Several fine plants of the water loosestrife, *Decodon verticillata*, bearing excellent seed pods were also discovered.

Few flowers were still blooming, among them being *Aster spectabilis A. ericoides*, *Bidens bipinnata*, *Saponaria ocymoides*, *Lepidium virginicum*, *Taraxacum officinale*, *Chrysopsis mariana* and the dying remnants of various goldenrods.—*Solidago odora*, *rugosa* and perhaps *ulmifolia*.

Solidago odora was very common. The anise-like odor is very pleasant and I understand colonial housewives often made a palatable tea from the dried leaves. I brought some of the leaves home, made the experiment and found that it had a delicate pleasant flavor.

Betula nigra, the river birch, was fairly common at the head of the lake. Its pink tinted, fuzzy bark and unevenly serrate leaves are sure identifications. Noticeable also was the deep green of the sweet bay, *Magnolia virginiana*, which forms extensive colonies wherever the ground is sufficiently damp. During a mild winter the leaves do not fall off.

We noticed a few colonies of sensitive fern not yet touched by the frost. Among them many fertile fronds of the chain fern attracted attention. The recent spell of dry weather did not allow the development of mushrooms, only two being seen, *Laccaria laccata*, and a species of *Entoloma*, also a few clumps of *Indian pipe*. We found many specimens of willow oak, *Quercus phellos*, and some Spanish oak, *Q. falcata*. *Quercus ilicifolia* and *marilandica* accompanied *Pinus rigida* wherever the typical Pine Barren stretches prevailed. A few American chesnuts were making their persistent and perennial attempts, to grow to their ancient glory.

A real surprise not connected with botany was seeing a woman leading on separate chains a silver fox and western coyote. The glistening grayish black pelt of the fox with the tip of the tail pure white formed an unusual picture. The coyote was almost as large as a police dog and nearly the same color. he was more amenable to our friendly demonstrations than the fox who still showed some of his woodland reticence.

The party encountered several flocks of Myrtle warblers, quite drab in appearance, except for the telltale yellow rumps. Chickadees and juncos kept us company all the way.

George F. Dillmann

Field Trip of November 17

The rain of the metropolitan area on November 17 consisted entirely of snow and sleet in the Suffern to Ramapo country; as a result the ground was completely covered with snow and ice, and the study of liverworts and mosses was impossible.

Though the weather made it seem somewhat anomalous, it

was decided to substitute a search for signs of spring. The preceding period of more than two weeks of unseasonably high temperature had given rise to frequent reports in the newspapers of the flowering of fruit trees especially; though this is not at all an unusual phenomenon, it was emphasized by the opening of the buds of *Forsythia*, *Ginkgo*, and *Acer* within and close to the city.

A study of the buds of our native plants, for comparison with the cultivated genera mentioned above, was made. The outer bud scales of the Shag-bark Hickory, *Carya ovata*, were dropping in certain cases; those of the Cherry Birch, *Betula lenta*, had elongated, so that the green portions of the scales were exposed for a considerable distance between the brown parts; and the buds of the Gooseberry, *Ribes oxyacanthoides*, also seemed unusually far along. Aside from this meager evidence, the obvious conclusion was that the overwhelming majority of the plants examined gave no indication of precocious development. One might expect, perhaps, flower buds of Spice Bush, Flowering Dogwood, or the aments of the Alder to show some effect of the warm weather; but the results were negative in each case. Red Maple, *Viburnum*, Mountain Laurel, Tulip Tree, Oaks, and numerous other genera were examined; all of them were in the normal winter condition. The great majority of the woody plants between Suffern and Ramapo certainly showed no appreciable effect of the "warm spell."

Edwin B. Matzke

PROCEEDINGS OF THE CLUB

Meeting of November 20, 1935

This meeting was held at the Boyce Thompson Institute at 3:30 P.M. There were thirty-five members present. Minutes of the meeting of October 16th were read and approved.

The following people were unanimously elected to membership in the Club: Mr. Erwin Magenheim, 20 So. Broadway, Yonkers, N. Y.; Dr. Robert S. Snell, Department of Botany, Miami University, Oxford, Ohio; Dr. J. J. Taubenhaus, Chief of Division of Plant Pathology and Physiology, Agricultural Experiment Station, College Station, Texas; Mrs. A. G. Vestal, 309½ W. Columbia Avenue, Champaign, Ill.

Dr. Anne M. Wellintz, Assistant Professor, Brooklyn College, 66 Court Street, Brooklyn, New York, became a field member in the Club.

Dr. P. W. Zimmerman of the Boyce Thompson Institute gave a talk on "A General Discussion of Growth Substances."

Dr. A. E. Hitchcock of the Boyce Thompson Institute gave a talk on "Absorption of Growth Substances by Plants and Their Movements Within Plants." A lively discussion followed these talks.

Forman T. McLean
Secretary

Meeting of December 3, 1935

This meeting was called to order at the American Museum of Natural History at 8:15 P.M. by President Hazen. There were thirty-five members present.

The following people were unanimously elected to membership in the Club: Dr. William Randolph Taylor, Professor of Botany, University of Michigan, Ann Arbor, Mich.; Professor L. R. Wilson, Department of Geology, Coe College, Cedar Rapids, Iowa.

Mr. W. Stephen Thomas spoke on "Magic Haiti." He gave an account of adventures in Haiti and Santo Domingo, collecting cryptogamic specimens for The New York Botanical Garden. The talk was illustrated by motion pictures and colored lantern slides.

Meeting adjourned at 9:50 P.M.

Forman T. McLean
Secretary

Meeting of December 18, 1935

This meeting was called to order at Columbia University at 3:30 P.M. by President Hazen. There were forty members present.

The following people were unanimously elected to membership in the club: Professor H. M. Jennison, University of Tennessee, Knoxville, Tenn.; Miss Mary Roscoe, Barnard College, Columbia University, New York, N. Y.; Dr. H. H. York, Botany Department, University of Pennsylvania, Philadelphia, Penn.

The resignations of Miss Minna F. Koch, Miss Bessie J. Nelkin and Mr. George L. Zundel were accepted with regret.

The death of Miss Helene Lunt and Professor David Griffiths were reported.

Mr. W. G. Camp of New College, Columbia University, gave a talk on "Growing Protoplasm for Experimental Purposes."

Professor J. S. Karling of Columbia University gave a talk on "The Cytology of Cladochytrium replicatum."

Meeting adjourned at 5:00 P.M.

Forman T. McLean
Secretary

Meeting of January 7, 1936

The meeting of the Club was held at the Men's Faculty Club of Columbia University immediately following the annual dinner.

The meeting was called to order at 8:20 P.M. with forty-one members and guests present.

The following persons were elected to membership in the Club: Mr. Marc. Appleton, 708 West 192nd Street, New York, N. Y.; Mr. Henry de la Montagne, 198 Chatterton Parkway, White Plains, New York; Mrs. James W. Marvin, Columbia University, New York, N. Y.

The resignation of Miss Zaida Nicholson was accepted with regret.

It was proposed by President Hazen and unanimously voted by the Club that our Field Chairman, Mr. Raymond Torrey, be delegated as representative of the Club at the New York, New Jersey Trail Conference.

Reports of the Secretary, Treasurer, Editor, Editor of TORREYA, and of the Business Manager were read and approved. Report of the Bibliographer was verbal, simply stating that material covered by her work was all published in the Bulletin.

Dr. Dodge, as representative of the Club on the Council of the New York Academy of Sciences, reported that he had attended the meetings and represented the interests of the Club there.

No report was made by the delegates to the American Association for the Advancement of Science, as neither of these was present.

Dr. Hazen reported that he had attended the meetings of the Board of Managers of the New York Botanical Garden as representative of the Club.

It was moved by Dr. Karling and seconded by Dr. Harper that a committee be appointed to consider the creation of two new officers in the Club to share the duties now delegated to the secretary, namely, a corresponding secretary and a recording secretary; and to consider the creation of new classes of membership. It was moved by Dr. Matzke and approved by the Club that Mrs. Marvin be designated Assistant Treasurer of the Torrey Botanical Club.

The report of the meeting of the Council of December 18, 1935, was read in which the nominations of officers made by the Council for 1936 were given.

It was then unanimously voted that the secretary be instructed to cast one ballot for this entire group of nominations.

The complete list of new officers is printed on the inside front cover of this issue.

It was voted to extend a rising vote of thanks to Dr. Hazen, Mrs. Harper, and Dr. McLean for their services to the Club.

It was voted that the Secretary write to our Associate Editor, Mr. G. T. Hastings, thanking him for his annual report and expressing the Club's regret at his illness and hope for a speedy recovery.

The Secretary was also instructed to write to Dr. Zimmerman and Dr. Hitchcock congratulating them as members of the Torrey Botanical Club, on their receipt of a special prize of one thousand dollars for their research work which was reported at the St. Louis meeting.

Dr. Hazen then gave a brief retiring address telling about the meetings at Amsterdam where he represented the Club in the nomenclature discussion. He also spoke about the development of the Council of the Torrey Botanical Club, on the work of the field committee and of the Treasurer, especially concerning the large investments of the Club which are administered by the Treasurer.

Dr. Trelease and Dr. Matzke brought up the point that the January number of the Bulletin, as sent out to them and to other members, was in many cases defective and asked what action should be taken. President Hazen was of the opinion that these should be assembled and returned to the printers and that the Editor and publishers be notified by the Secretary of the defective copies.

The meeting adjourned at 9:50 P.M.

J. S. KARLING
Secretary

MEETING OF APRIL 18, 1934[1]

The meeting was held at the Boyce Thompson Institute for Plant Research at Yonkers. Tea was served in the library at 3:00 P.M.

At 3:30 P.M. Dr. Zimmerman took charge of the program which consisted of "Demonstrations of a Variety of Methods, Technique, Apparatus, etc., developed at the Institute." The program was as follows:

1. Dr. Hartsell, in his own laboratory, gave a demonstration of killing power of radio waves on animal and plant tissues.

2. Mr. Myers, who is in charge of the Dutch Elm Disease studies at the Institute, gave a brief summary of recent discoveries by the various investigators.

3. Mr. Flory gave a brief talk on "Photographic equipment and methods developed to meet requirements for plant research" and also demonstrated some of the apparatus employed.

[1] Through an oversight, the minutes of this meeting of April 18, 1934, were not heretofore printed. They are of importance, not only for recording the interesting scientific program at the Boyce Thompson Institute, but also for placing on record the formal adoption of the Amendments to the Constitution and By-laws of the Club reported by a special committee at the meeting of March 21, 1934, and published in TORREYA for May-June of that year (34:82).

4. Mr. Youdir spoke on "The application of physical chemistry to biological projects" and illustrated a number of ingenious contrivances particularly in relation to photo-electric cells.

5. Dr. Hitchcock demonstrated "Technique developed to determine the cause of blue discoloration in Hydrangeas" and also summarized the results of their investigations.

6. Dr. Zimmerman gave a short illustrated talk on their work concerning the translocation of materials backward and forward through the stems at the same time.

Vice-President Wodehouse took the chair at this time and on behalf of those present expressed to Dr. Zimmerman their appreciation of the afternoon's program.

Approximately ninety persons were present for the first part of the program. This included the Botanical Club of Barnard College, present under the charge of Dr. Sinnott.

A business meeting was called and about twenty-eight members remained. The minutes of the meetings of March 21st and April 3rd were read and approved.

Mr. James Kezer, 10 Orchard Road, Chatham, N. J., was unanimously elected to membership in the club.

The resignation of Miss A. Mabel Barrow, 1325 Pacific Street, Brooklyn, N. Y., was accepted with regret.

Dr. Harper presented the Report of the Committee on Amendments to the Constitution, and moved its adoption. It was seconded by Dr. Karling and carried unanimously.

The meeting was adjourned at 4:50 P.M.

S. M. Pady
Acting Secretary

NEWS NOTES

At the meeting of the Botanical Society of America held in St. Louis in December the following officers were elected: Dr. C. Stuart Gager, president; Dr. H. A. Gleason, vice-president; Dr. F. E. Denny, treasurer; Dr. C. E. Allen, member of the editorial board of the American Journal of Botany. All of these officers are also members of the Torrey Botanical Club.

The New York Botanical Garden and the Royal Botanic Gardens of Kew, England, have arranged for an exchange of student gardeners for this year. From New York Mr. Howard Swift is being sent to represent the Botanical Garden. The English Speaking Union is paying the travelling expenses of the students.

At Huntington College, Indiana, five acres of the partly wooded campus has been set aside for an arboretum and botanical garden. It is planned to grow in the garden as many of the flowering plants, shrubs and trees of Indiana as will grow in the region.

Dr. T. H. Goodspeed, leader of the botanical expedition to the Lower Andes of the University of California, has reported that a collection of 2,000 herbarium specimens has so far been made during the trip. Dr. Goodspeed has given lectures before the American Club of Peru, the University of Chile, the Scientific Society of Santiago, and the Museo National de Historia Natural in Chile (Science).

A new botanical society has recently been formed known as the Southern Appalachian Botanical Club. The club will publish a journal to aid in spreading knowledge of the flora of the region. The officers of the club are, president, F. A. Gilbert, Marshall College, Huntington, W. Va.; vice-president, Randolph Boggess, Duke University; secretary, Paul R. Stewart, Waynesburg College; treasurer, Nellie Ammons, West Virginia University; editor, Earl L. Core, West Virginia, University.

F. A. Varrelman of the American University, Washington, D. C., is spending a year in Europe studying botanical gardens for a sub-committee of the Library Committee of the House of Representatives. The study is undertaken with the idea of making more complete the plans for a new botanical garden which Congress hopes to develop in Washington. Mr. Varrelman's winter headquarters are at the Botanical Institute of the Botanical Garden of the University of Vienna.

THE TORREY BOTANICAL CLUB

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OF THE

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In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–62 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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BY
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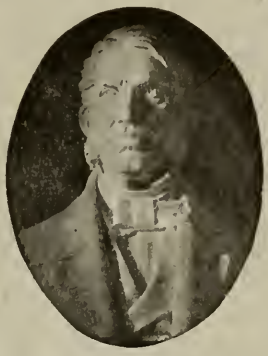

John Torrey, 1796-1873

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Bibliographical Miscellany—II. Bentham's specific names based on habit of the plant

Joseph Ewan

Such strange specific names for plants as *centranthifolius*, *bartsiaefolia*, and *zizyphoroides* will come to the notice of even the casual student of the Californian flora for they present upon first sight a wholly unfamiliar, if indeed not unpronounceable, aspect. And, it may be wagered, the enigma will persist indefinitely (except with the mentally irritated) until such time as chance reading or conversation with an informed person supplies an explanation for them. Upon noting the author of these and many names of similar construction, it will be found that George Bentham (1800–1884) is often responsible for their proposal. Random notes on this phytographic device of Bentham, along with a few illustrative instances from the Californian flora and a postulated reason for its dextrous use by Bentham, may be of interest beyond the field of examples given, for this practice was carried widely into his descriptive botanical writings.

From his several analytical biographers[1] as well as from personal examinations of his terse descriptions, it may be easily discovered that Bentham was peculiarly gifted as a systematic botanist, with, as Joseph Dalton Hooker remarked, "method, grasp of subject, and thoroughness" as his "watchwords." Direct evidence of his attitude may be found in his own declaration of the principles of systematic botany prefaced to the "colonial floras" where, as in the Flora Australiensis (1863), he proposed that "descriptions should be *clear*, *concise*, *accurate* and *characteristic*." The importance of this last quality bears

[1] The best biography of Bentham with an estimation of his powers was written by Sir Joseph Dalton Hooker, embracing the materials of four earlier accounts apart from his close personal friendship with Bentham (Ann. Bot. 12: ix–xxx, with portrait. 1898).

upon the best possible choice of specific name for it introduces the "association" factor. A characteristic plant name brings to mind the singular features of habit or morphology of a species and aids in its subsequent ready recognition.

To Bentham species were characterful "individual plants" in a sense. And, to the end of designating species by alluding to a distinctive character, he commonly employed a name which would recall a genus or species, perhaps nearly or as often quite distantly related, distinctly simulating the plant in question. This simulation between species is commonly one of habit. "The habit of a plant," Bentham wrote, "consists of such general characters as strike the eye at first sight." Thus the distinctive habit of a newly described plant is emphasized by an allusion to that of a previously described genus or species, to be sure often not well known to the resident of the country in which the novelty grows: accordingly the allusion fails. Bentham described for example *Uranthus* (now united with *Eustoma*) *chironioides* (Pl. Hartw. 47, 1840) from Chico, (?) Hidalgo, Mexico, when *Chironia* (Gentianaceae), the genus alluded to, is wholly of Africa and Madagascar in its distribution and unfamiliar to the Mexican botanist. Similarly he named *Forestiera phillyreoides* (Benth.) Torr. from a Guanajuato collection, "phillyreoides" being reminiscent to Bentham of the wholly Old World oleaceous genus *Phillyrea*, but the name perhaps carries no intelligible meaning to the student of the Mexican flora. It will be seen however that an examination of the materials of these comparable genera shows, as will be seen in certain examples given beyond, striking resemblances and it is easy to see how a phytographer familiar with several floras of the world, as was Bentham, would draw such comparisons in his choice of specific names. It will be noted that Karl Sigismund Kunth (1788–1850) and the DeCandolles employed this device of specific naming perhaps even before Bentham, as indeed it goes back to the time of Linnaeus in a somewhat different and less pronounced way, but it is in the writings of Bentham that it proves "characteristic."

The amount of descriptive work accomplished by Bentham was truly enormous. Thus his contributions to DeCandolle's *Prodromus* alone involved, according to Hooker, the descriptions of 4,730 species. And this, it will be remembered, embraced

but five families in that work, viz. Ericeae, Polemoniaceae, Scrophulariaceae, and Labiatae, and constituted but one of his several major labors. It is to Bentham's world-wide familiarity with plant families and their finer composition, crystallized in his co-authorship with Hooker of the *Genera Plantarum*, that this fresh approach to the naming of plant species is probably due in a large measure. This cosmopolitan familiarity, then, coupled with his rule of designating *characteristic* attributes of a species, especially of habit, has given rise to such unfaded botanical names as are otherwise infrequent in the annals of descriptive botany.

If some instances of this practice are examined in the light of the plants referred to by such alluding specific names, the precision of choice on Bentham's part becomes evident. Of the several examples that have come to notice among the plants of California described by Bentham there may be listed the following from the three families, Polemoniaceae, Labiatae, and Scrophulariaceae:

(a) *Aegochloa* (*Navarretia*) *atractyloides* Benth. Refers to the composite genus *Atractylis* of the Mediterranean region and temperate Asia, numbering some fifteen species. The Mediterranean *Atractylis cancellata* L. is suggestive of the Californian *Navarretia* in habit and congested inflorescence though the heads in the composite are larger.

(b) *Gilia pharnaceoides* Benth. Alludes to the resemblance of habit to the genus *Pharnaceum* of the Aizoaceae of South Africa. Particularly does the *Gilia* species recall the habit of *Pharnaceum dichotomum* L.f. In that species the arrangement and shape of the leaves is very close.

(c) *Pogogyne zizyphoroides* Benth. The habit recalls another menthaceous genus *Zizyphora* of the Mediterranean region and central Asia, especially such species as *Zizyphora tenuior* L. of Persia which has the flowers arranged in close-set "verticellasters" in the manner of the Californian *Pogogyne*.

(d) *Stachys ajugoides* Benth. Habit suggestive of the Old World labiate genus *Ajuga* which Bentham characterized as "herbae annuae, perennes vel vix basi suffruticosae, saepe procumbentes vel adscendentes, nunc stoloniferae" (Lab. Gen. et Sp. 690. 1835). It is this "procumbent" aspect which characterizes the Californian *Stachys*. This species has been variously

misunderstood but it is a low, few-branched and lightly spreading plant of the coastal marshes and does not penetrate far from the coast. This singular habit among the Californian species is aptly recorded in Bentham's name.

Other Californian Labiatae species named by Bentham which carry recognizable specific names of this type are *Scutellaria antirrhinoides*, *Lophanthus* (*Agastache*) *urticifolius*, *Salvia carduacea*, *Audibertia stachyoides*, and *Calamintha mimuloides*. Bentham explains his unusual choice of name for *Salvia columbariae* with the phrase "habitus fere *Scabiosa columbariae*." *Scabiosa columbaria* L. is a Mediterranean species with a thin cluster of basal leaves of a pinnatifid filagree nature and capitate inflorescence, all calling to mind the Californian Chia.

(e) *Collinsia bartsiaefolia* Benth. Alludes to the resemblance of its leaves, diagnostic for this species, to the genus *Bartsia* (or *Bartschia*) numbering some thirty species in South America, Europe and Africa. The Californian *Collinsia* resembles *Bartsia versicolor* Pers. in habit, inflorescence and leaf-margin, although the whole genus apparently exhibits the *crenulate* character of the leaf which uniformly distinguishes the well-marked *Collinsia*.

(f) *Penstemon centranthifolius* Benth. Alludes to a small European genus of Valerianaceae, *Centranthus*, and probably precisely to the Mediterranean *Centranthus ruber* DC. with which it perfectly agrees in the leaf shape and the firmness and glabrous character of the foliage making up its distinct habit. The leaves are sessile in the manner of the *Penstemon* and borne in the same ascending fashion.

To Bentham's observation that "the aptness of a botanical description, like the beauty of a work of imagination, will always vary with the style and genius of the author" may be added aptness in choice of species names, an art in which he was significantly proficient.

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A city's trees

H. Elliott McClure

As a relief project the City of Danville, Illinois, instigated a tree survey during the months of August, September, and October of 1934, under the supervision of the street commissioner. The object of the survey was to determine the condition of all trees on public property and those of private property in the front yards and to locate dying and diseased elms in an effort to check or prevent further spread of the diseases that seemed so common.

The Trees of Danville, Illinois

More than 18,000 trees were examined in the three months and this was probably 90% of the trees within the main part of the city. Of these trees 59% were healthy, 38% in need of care, and 3% were dead; 29% of the trees, or 7,000, were on public property and of these 61% were healthy, 36.6% needed care, and 2.4% were dead. Of the 11,000 trees on private property, or 71% of the total, 57% were healthy, 39.4% needed care, and 3.6% were dead. Trees in the parks were, with the exception of the elms, in uniformly good condition. Trees on the boulevards were crowded and starved and were in poor condition. As the trees on private property have more room to grow, it would be expected that they would be in better condition than those on the boulevards. This was not true for the condition of trees in both situations was relatively the same.

There were 29 different groups of shade trees in the city and of these, eight constituted 87%. These eight were soft maples, elms, box elders, catalpas, ailanthus, hard maples, cotton-woods, and oaks.

Soft Maples

Three thousand three hundred and thirty soft maples were examined and of these 38% were on public property and 62% on private. They constituted 17% of the city's trees. Only 56% of the trees were found to be healthy. This is due to the fact that they have been butchered throughout the town. Soft maples are very susceptible to heart rots and wherever they are injured they tend to rot. Nineteen per cent of them had been topped and in no instance was a topped tree found to be free of

heart rot. This holds true for practically every kind of tree. This fact alone would condemn the practice of topping. Besides topped trees, 19% of the untopped trees were rotten from wounds and bad pruning. This means, then, that 38% of the city's most numerous trees have been ruined by neglect and maltreatment. No diseases were apparent in sufficient abundance to endanger the life of the trees and only 1.6% were dead. As the summer was very hot, many of the soft maples had tip burned, especially on boulevards where they were subjected to intense heat from the pavement.

Elms

The survey was deemed necessary from the continued and extensive death of elms. For the past five years, elms, both American and Slippery, had been dying in great numbers. For the past three years the rainfall had been low in midsummer and drouth had been long, so that the water table had been greatly reduced. This lack of water has been attributed by many as the cause of the death of the elms, but it was found that in addition several diseases were killing the trees.

In Danville three diseases were most apparent and of them, one was most injurious. Nearly 3,000 elms were examined and of these 63% were healthy, 26% were sick, and 11% were dead. Elms constituted 15% of the trees and more than 1,000 were sick or dead. The one fungus causing most of this destruction seemed to be *Xylaria*, a root disease. The other two diseases, *Coniothyrium* and *Vermicularia*, limb diseases, were killing fewer trees.

The apparent methods of attack for these diseases will be given. *Xylaria* attacks first the young rootlets of the elm and in the early stages the tree shows a slight thinning of the leaves. Only after examining hundreds of elms does this early condition become apparent and then all that can be said is that the tree does not look quite right. The growth in the twigs will be noted shorter for that year. Then as the disease works back along the root it is killing, the tree shows this condition in two ways: Either there is a general, very apparent thinning of the leaves and the growth is short, or small limbs and individual leaves throughout the tree will turn bright yellow and fall. From then on, in the third or fourth year, the progress of the dis-

ease is very rapid, especially when the tree is subjected to drouth conditions. Several conditions may occur simultaneously or be manifested differently in different trees. A tree which looks in fine condition except for the slightly sick appearance will suddenly turn yellow and all but the tip leaves of the branches fall off. Within two weeks it will be dead or nearly so and loose bark or dead tissue may be found at the base of the tree where the roots have died. In other trees the leaves are small and not very numerous and loose bark may be found at the base. These trees are the more resistant ones which dropped their leaves the year before and attempted to survive the following spring. In all cases where trees were dying or had died, the twig growth for the last three to five years was steadily shorter, showing a decline of the trees. There are several identifying marks about *Xylaria*. In advanced stages when there is no help for the tree, loose bark about the base over the dead tissues can be found, and if this bark is peeled off it will be noted that the diseased tissue extends up the trunk of the tree twenty or thirty feet and finally dwindles to nothing. Eventually *Xylaria* can be cultured from the furthest tips of the limbs, having permeated the whole tree. After a tree has been dead for some time, or when it is dying, white hyphae may be seen under the loose bark, the diseased wood is punky, and, if a piece of wood is chiselled out, it will be found to contain an irregular fine black line at distances ranging from the surface. In most cases this is very easily demonstrated if the fungus is present. On dead roots, occasionally, small upright horns about an eighth of an inch high may be found. These are the fruiting bodies.

Where isolated trees become sick and die from *Xylaria* it seems probable that the fungus spores have been distributed by the wind and have entered the soil. Where elms have been planted in rows, the fungus travels from root to root and from tree to tree. Invariably the tree that is sickened has diseased roots on the side facing the dead tree. In this way rows of 25 or 30 elms have become infected.

Coniothyrium and *Vermicularia* are present in Danville in some abundance but can be controlled and are not alarming. *Coniothyrium* is a limb disease which enters twigs and kills the cambium causing individual limbs to wilt and die. In these

TABLE 1. INFORMATION CONCERNING THE TREES EXAMINED IN DANVILLE, ILL.

Name of Tree	No. on Boulevard	No. on Private Property	No. in Parks	Condition of Trees[1]								Total Trees
				Healthy	Stubs	Heart Rot	Topped	Tip Burned	Other Diseases	Insects	Dead	
1. Soft Maple (Acer)	1286	2042	3	1869	600	632	632	63			55	3331
2. Elm (Ulmus)	748	1688	431	1801	86	17	34	43	774		334	2867
3. Box Elder (Acer Negundo Linn.)	567	1624		800	350	525	591	13	43	262[2+3]	21	2191
4. Catalpa (Catalpa)	863	1043	15	433	42	1421	76				4	1921
5. Tree of Heaven (Ailanthus)	476	1363		1776		23	36			128[4]	6	1839
6. Hard Maple (Acer)	615	857	225	1391	220	169	50	75			17	1697
7. Cottonwood (Populus)	572	744	236	267	776	23	465				97	1552
8. Oaks (Quercus)	24	834	530	1328	943[5]	27	27				10	1388
9. Walnut (Juglans)	13	167	148	49	170	16	10		239[6]	32[7]	15	328
10. Ash (Fraxinus)	55	173	49	237	110[8]	32	27				3	277
11. Hickory (Hickoria)	6	105	121	205	116[8]	5					18	232
12. Linden (Tilia)	47	107	27	162	41	7	5				2	181
13. Sycamore (Platanus)	26	78	67	167	4	3	3				2	171
14. Mulberry (Morus)	13	89	19	100	10	8	4				2	121
15. Willow (Salix)	11	62	40	70	25	11	11				2	113
16. Hackberry (Celtis)	9	37	53	99	3							99
17. Chinese Elm (Ulmus)	32	61		89							4	93
18. Buckeye (Aesculus)	11	39	17	51	3	6	2	20			1	67
19. Birch (Betula)	8	43		44	5	5	5				2	51
20. Lombardy Poplar (Populus)	8	39		42					5		1	47
21. Locust (Robinia)	6	35	4	31	5		9					45
22. Wild Cherry (Prunus)	3	10	14	25	4							27
23. Tulip (Liriodendron)	3	19		19	3							22
24. Silver Poplar (Populus)	4	12		15	1							16
25. Hawthorne (Crataegus)		12		11	1		1					12
26. Sassafras (Sassafras)		6				6	6					6
27. Ginkgo (Salisburia)		4		3		1						4
28. Kentucky Coffee Tree (Gymnocladus)		3		3								3
29. Butternut (Juglans)		2		2								2
Totals	5406	11298	1999	11047	3518	3468	1896	214	1061	422	596	18703

1. One tree often had more than one thing wrong with it. 2. Bagworms, *Psyche*. 3. Tent Caterpillars. 4. Webworm, *Atteva aurea* Fitch. 5. Healthy oaks needed pruning. 6. Leafspot. 7. Tent Caterpillars. 8. Healthy ashes, hickories, and other trees needed pruning.

diseased limbs may be found long brown streaks in the heartwood by which the fungus may be identified. *Vermicularia* is similar in its attack of limbs, but leaves no brown streaks in the wood. It may be identified by the complete browning of the diseased cambium. This browning may be seen by peeling back the bark. Both of these diseases will kill a tree if allowed to progress, but as they begin locally, they may be controlled by careful pruning.

Box Elders

More than 2,000 box elders, or 11% of the trees of Danville, were examined and found to be in uniformly bad shape. They, as well as the soft maple, have been topped and hacked. Only 36% were in a healthy condition and 64% needed care. They were extremely tenacious to life and produced leaves even when practically ready to fall from having been weakened by rots. Twenty-eight per cent had been topped and were rotten, and in addition 24% were gutted with rots entering from injuries and bad pruning. *Gleosporium*, a twig blight, was doing considerable damage and 2% of the trees were severely injured by it.

Box elders are mainly obnoxious because of their numerous insect pests. Practically every tree had a few box elder bugs (*Leptocoris trivittatus*, Say.) and some were crimson colored when the insects gathered on them in the sun. An extremely heavy infestation of these insects occurred all over the city. About 1% of the trees had tent caterpillars in them, but the infestation was not heavy. The bagworms (*Psyche*) that attack box elder trees had severely injured or defoliated 11% of the trees. This heavy infestation was in local groups of trees at different points in the city and could well have been controlled by spraying. In some cases a single tree was topped, full of heart rots, stripped by bagworms, infested with box elder bugs, tip burned from the heat and infested with termites in the rotted heart.

Other Trees

Information concerning the remaining trees in the city is given in Table 1. Those listed as healthy had good color in the leaves, were in good structural condition and had no noticeable

diseases or insect pests. Those trees which had been poorly pruned are listed under "stubs." Those badly infected with heart rots from other causes than topping and those that had been topped are listed separately. Under the heading "tip burn" have been placed all those that showed sunburn, heat scald, etc. Under the heading "other diseases" have been listed all those showing the effects of diseases other than rots.

Summary

Trees in the City of Danville, Illinois, were examined in 1934 for physical defects and diseases. Only 59% of the entire tree population, 18,700, which was more than one tree to every two persons, were healthy and 38% were in dire need of care. Three per cent were dead at the time of the survey and more elms have died since. This death of elms has been attributed to a group of causes including drouth and disease. All of the trees have been subjected to the unhealthy condition of the city and most of them are showing the effects of this.

Urbana, Illinois

A new golden rod from Northern New Mexico

T. D. A. Cockerell and D. M. Andrews

The plant described below was found in some abundance by D. M. Andrews on rocky slopes of Mount Capulin National Monument, New Mexico, where it appeared to favor the driest positions. When transferred to the moister garden it retained essentially its natural habit, but the inflorescence became somewhat more ample in its branching.

Solidago capulinensis n. sp.

Caulis 8.5 dm., multicephalus, erectus, strigosus, rugosus, purpurascens; rami laterales numerosis; foliis lanceolatis, alternis, viridibus, paucedentalis, numerosis; capitulis long. prox. 5.5 mm., lat. 3.5; phyllariis subacutis, viridimaculatis; acheniis quinquecostatis, glabris.

Erect, about 8.5 dm. high, with several to many strong stiff stems from a compact crown, the very short runners from base of stems being nearly erect; stems rough, striate, and suffused with purplish; radical leaves spatulate or oblanceolate, 10–15 cm. long, 2 cm. or more in width, broadly acute or rounded at the tip, pinnate-veined, serrate above the middle, entire and narrowing toward the base, the whole margin of the leaf ciliate with curved hairs; cauline leaves sessile, alternate, lanceolate, rough but not canescent, remotely dentate beyond the middle, the margins very briefly ciliolate with minute curved hairs; inflorescence spreading, with many axillary branches, but not at all flat-topped, heads densely crowded; heads about 5.5 mm. long and 5 wide, the phyllaries in about three rows, appressed, rather obtusely pointed, whitish, with a large lanceolate green mark at upper end, having for its stem the narrow green midrib; pappus white, about 3.5 mm. long; corolla bright orange, about 5 mm. long. At maturity the slender glabrous achenes become about 3 mm. long, and are strongly 5-ribbed. The phyllaries exhibit a faint striation or ribbing, hardly apparent after drying, whereas those of *Oligoneuron rigidum* (L.) have five parallel pale green lines. The plant differs greatly from *O. rigidum* and its immediate allies in not having the inflorescence at all flat-topped, and the heads smaller. In contrast with *O. rigidum*, the leaves are bright green, much

smaller, narrower and more numerous, with the lateral veins leaving the midrib at a much more acute angle; the small uppermost leaves are narrowly lanceolate, not at all ovate or broad cuneate. The lower stem-leaves are about 95 mm. long and 18 broad, and are sessile, crowded on the stem. There are about 27 florets in a head; the narrow corolla-lobes are about 1.7 mm. long. The inflorescence resembles *Solidago oreophila*, but that has quite different leaves, and larger heads. The stem is like that of *S. puberula* Nuttall.

In Rydberg's key (Flora of Rocky Mountains) it runs nearest to *S. concinna* Nels., a much smaller plant, with pubescent achenes, those of our plant being quite smooth. In Small's key (Flora S. E. States) it goes to *S. lindheimeriana* Scheele, which has entire leaves. In Britton and Brown (Ill. Flora) it will not go satisfactorily anywhere, but the closest resemblance is perhaps to *S. hispida* Muhl. In Rydberg's Flora of the Prairies and Plains it clearly falls in the Speciosae, and apparently nearest to *S. lindheimeriana.*

In full flower the rather short broad heads have the phyllaries conspicuously marked with green apically, often to the exclusion of the light margin seen in most species. This gives a spotted effect, as in *S. oreophila* Rydb. Later, as the heads go to seed, the phyllaries become more elongated, and paler, and for the most part show only a pale suffused green central stripe, more in the manner of *S. concinna* Nels. The pattern of the phyllaries in most *Solidago* consists of a green central stripe, with a variable amount of green extending suffusedly over the apical part, but usually leaving a distinct light margin. *S. missouriensis* Nutt. is exceptional in that there are two green stripes, separated by a light median stripe.

Our plant may be a western derivative of *S. puberula* Nuttall, with shorter, less acute phyllaries and rough stem. Capulin, where the plant was discovered about August 18, 1930, is about 18 miles from the Colorado line, and two or three times that distance from Oklahoma.

Boulder, Colorado

Trailing the dogwood

Martha H. Hollinshead

It is a long way from the flowering dogwood and the Atamasco lily in South Carolina to the Pacific dogwood and the mariposa lily in California. The lilies are not essential to the dogwood but the pines of the South and the redwoods of the Northwest are, for the dogwood does not grow in pure stands, as the lumbermen say, but under and among other trees.

One day in April near Summerville, South Carolina, we drove along a road exactly to our liking. We passed through groves of the long-leaf pines to a road bordered by young magnolia trees whose flowers were "just begunnen to open" our colored driver said, and came to a so-called "island" where there were tall trees whose green tops overshadowed pink clouds of azalea, greenish white foam of fringetree, and snowbanks of dogwood. The level branches of the latter caught the rays of the setting sun as they penetrated the dark woods and made an unforgettable picture.

The flowering dogwood, *Cornus florida*, is found in that portion of the United States bounded by the Great Lakes, Atlantic Ocean from Maine to northern Florida, the Gulf of Mexico as far west as Texas and east of a line drawn from Texas to Iowa, so that it is quite familiar in the central, eastern and southern States.

On the Pacific coast, other species of dogwood are found from California to British Columbia. The Pacific dogwood, *Cornus Nuttallii*, is one of the four species that grow to tree-size. It is taller than *Cornus florida* and sometimes reaches a height of 100 feet, while the eastern tree seldom rises above 40 feet.

In late April and early May in New Jersey and Pennsylvania, the "blossoms on the dogwood unfold their silken wings" and their beauty adorns the woodlands. In Pennsylvania, the dogwood is associated with oaks, elms, maples, shrubby Cornus and azaleas to make a lovely natural landscape. When planted on lawns with the pink variety and some evergreens, it rivals the Japanese cherry in attractiveness.

Frances Duncan says "The flowers lift their faces to the sun, without a thought of turning so that the passer-by may have a better look." There is a belief that the fisherman will have

luck if he casts his line when the dogwood is in flower. A poet writes

White dogwood blossoms hold my heart,
But rare pink ones I know,
That make the wonder of this world
Into the heart's deeps go.

White dogwood, ivory beauty rare,
Spreads far its net of dreams,
But where a rosy dogwood tree
Stands by two silver streams

My heart has lingered, lost to all
That makes a world.

Later in the year, *C. florida* leaves blaze with color. Its berries are red. *Cornus* is patriotic, for some of the shrubby species have white and some have blue fruits. In October, a New Jersey woodland of pines towering above dogwoods and edged with red gum-trees and with a carpet of bright huckleberry bushes makes a soul-satisfying sight.

Usually a symmetrical tree with almost horizontal branches, the dogwood can adapt itself to varied habitats. It can be a tree of considerable girth and height, or it can be a crooked, spindly one pushing itself from between boulders and spreading its bloom over the rocks as may be seen on the banks of the upper Delaware River.

There are many species of *Cornus*. Most of them are shrubs. The silky dogwood called Kinnikinnick grows with thickets of witch hazel in Pennsylvania. Kinnikinnick means mixture. Country people in former days mixed the dried leaves and scraped inner bark with tobacco for their pipes.

From the bark of the roots and stems of the Pacific coast dogwood was obtained a bitter extract which was used as a substitute for quinine in fevers. In Edinburgh, an extract from a Scotch dogwood is used in the examination of eyes. The powdered bark may be used as a tooth powder.

The word *Cornus* means horn, the wood is hard, tough, fine and smooth. It is used for shuttles, mallet heads, skewer tips, pulleys, etc. It is high in price because of the limited supply. The common name was given because the hard wood was used

in making dags (same word as dagger) or skewers for holding the meat being roasted before an open fire.

Homer knew the strength of the hard wood and praised the lances made from it. The species he knew was most likely *Cornus mas*. Its fruit was fed to swine. The Basque people believed there was magic in a wand made from a branch of the dogwood tree.

Plutarch tells of the holy cornel tree that was close by the steps where Romulus dwelt in Rome. Romulus threw a dart, the staff of which was made of cornel, with such strength that it struck deep into the ground and grew and "produced a tree of considerable bigness." Posterity worshipped it and it was held sacred. If anyone saw it withering, he made outcry and people would run with pails of water to revive it. When Caius Caesar, they say, was repairing the steps, the laborers dug too close to the roots and the tree died.

The dogwood trail I know best in New Jersey is through woodlands where Indians once lived in wattle huts. My cabin is said to be on the site of the queen's wickiup. Nearby is a stream up which, a few years ago, beavers swam and cut several small trees on the bank. They must have come down the Delaware River to the Rancocas Creek and then to this branch known as Haines Creek. Beyond is a grove of persimmon trees. In the cabin flying squirrels made their winter quarters. At the edge of the wood is beach plum. Did the Indians bring the fruit there and leave the seeds, or is it there as a survival of an old sea-beach? The dogwood grows with holly and sassafras under pines and oaks. In season, one may find azalea, strawberry-bush, moccasin flower, New Jersey tea, sweet fern, and wild grape. When the sun is in the west and shining between the tree trunks, the "ivory trays" of dogwood flowers are lighted up and truly Cotoxon Pines is an alluring place.

In the Yosemite Valley, we saw thickets of dogwood, probably *C. glabrata*, growing in damp places. In the second week of August, we saw more of this on a flat on the way to the Tuolumne grove of big trees. It is associated with acres of blue lupine and red fireweed and was a restful relief after a steep and thrilling climb out of the valley on a rocky, one-way road where we feared the automobile would not safely manage some of the sharp curves as it toiled up the Sierras, for the Sequoias

grow at from six to seven thousand feet altitude. After entering a region where the yellow pine and the sugar pine grew to great size and height, we saw some large white blossoms of *Cornus Nuttalli*. Near them was the mariposa lily, and beyond were the giant redwoods.

The dwarf cornel, the bunch berry, pictures galore! One cannot think of the north woods without it. It grows by the trail, it grows by the rocks, it grows in the woods, it grows singly, it grows in groups—sunshine or shade matters not. It is quite as willing to be shy and delicate as sturdy and strong. So symmetrical in form and arrangement are the bracts and leaves that all have an equal share of sun and air.

On the carriage road up Mt. Washington masses of the dwarf cornel with its bright red berries, and here and there a belated white blossom, grow with the violets, the trailing chiogenes and the wild strawberry by the roadside. On July 20 on Mt. Moat, New Hampshire, we saw specimens of *C. canadensis* with as many as sixteen berries—a real bunch.

The dwarf dogwood resembles the tree dogwood in its ability to associate harmoniously with a wide range of plants east and west, but its range does not extend so far south. We like best to think of it in company with the pink Linnaea as we saw them growing in the Selkirk Mountains in British Columbia.

Moorestown, New Jersey

BOOK REVIEWS

Pennell on Scrophulariaceae[1]

A few years ago the late Dr. B. L. Robinson regretted the dearth of thorough and comprehensive monographic studies by American botanists. In this work by Pennell we have a remarkable contribution to this need, written with such sanity, clarity, accuracy and completeness that it would certainly have pleased Dr. Robinson with his well known zeal for detail and precision.

One needs only to read the introductory chapter of forty-five pages to grasp the spirit of the author: originality, without excessive manufacture of either species or varieties; modernism, still with adherence to the traditions of the past; obedience to nomenclatural rules, even though under mild protest; thoroughness, both in the field and the herbarium; and above all an occasional admission of imperfectness in his knowledge which deepens the confidence of the reader in the general accuracy of the book.

The day of old-fashioned taxonomy is past, at least for such countries as the United States. External morphology, derived from herbarium specimens alone, is no longer adequate evidence of specific limitations and relations. Pennell supplements structure with extensive field experience and correlates his results carefully with geographic distribution and floral migrations.

Obviously no critic is competent to discuss the merits of Pennell's concept of species and varieties unless he can rely on a personal experience as broad and as deep as the author's. I doubt if any such person exists. Certainly the keys, which largely replace the conventional descriptions, convey a fine impression of accuracy, of completeness and, especially, of balance and uniformity. There is no impression of "splitting" in one genus and of "lumping" in another. His species all seem to be solid and substantial. They appear to be separated from each other by characters of generally uniform weight. One feels that each one really denotes a definite race of plants.

Pennell's idea of a species is eloquently discussed in his

[1] Pennell, Francis W.: The Scrophulariaceae of eastern temperate North America. Monograph 1. Academy of Natural Sciences of Philadelphia, pp. xiv+650. 155 maps, 43 figures. N. 27, 1935. $5.00.

introduction. "Although workers in other fields have sometimes urged that species are mere subjective concepts, to taxonomists they are usually surprisingly definite entities." He accepts Du Rietz' definition of species as the "smallest natural populations permanently separated from each other by a distinct discontinuity in the series of biotypes." If there is intergradation between populations, the separate parts of the species are regarded as subspecies, varieties or forms principally on the basis of their geographical distribution, although they are always separable morphologically. His maps illustrate the distribution of each and in many cases they are quite convincing. In some, on the other hand, there is a very marked overlap (e.g. *Lindernia dubia* and *L. dubia major*) and the distinction must have been based primarily on structure.

The nomenclature of minor groups below the species has always been a problem and unfortunately the existing rules scarcely permit full expression of what we believe to be taxonomic relationship. The various components of a species are regarded by Pennell as jointly constituting the species. The bibliographically original element is distinguished by the adjective *typicus*. This word, as Pennell carefully explains, is not a part of the name of the plant, but is merely a Latin adjective appended to it, it has no author's name and cannot be referred to any place of publication. There can be either varieties or forms of a subspecies, depending on their importance, but the author refuses to admit forms of a variety. Thus we may find quadrinomials in use, as *Lindernia dubia major* var. *inundata*, but a quinquenomial is impossible. This is certainly in pleasing contrast to certain recent European work.

The 155 maps which accompany almost every species and subspecies are nothing short of remarkable. There is a dot or other symbol for every locality from which Pennell has seen a specimen. They show not only the general range but also the outlying stations; by their density they indicate abundance or conspicuousness; by lacunae among them they often indicate regions where collecting has been neglected. Correlation between geological or geographical features is clearly indicated by superposed lines, marking, for example, the fall-line, the limits of glaciation, and various other features as needed.

Gray's Manual describes 123 species and named varieties

of the family from the well known manual range. Seventeen of these are not discussed by Pennell, of which eleven are northern and extra-limital, four are introduced and apparently not regarded as established in our flora, and *Paulownia tomentosa* is excluded from the family. Only one remains unaccounted for, *Penstemon acuminatus* Dougl., a name not appearing in Pennell's index. Matching the names in Gray against those in the monograph is not always easy, since the author makes no attempt to include all synonyms and unfortunately neglects a few which are in current usage.

The monograph indicates 131 species or subspecies *typica* and 30 subspecies or varieties in the manual range, which for convenience has been terminated in the west at the Missouri River. This is a net increase of 55, of which seven represent extensions of range, twelve new introductions, one a rediscovery, while the remainder are due to new concepts in the separation of species and varieties. The whole monograph discusses 265 species and minor forms.

In the treatment of genera Pennell departs farther from the usage of current manuals. Instead of the twenty-eight genera (*Paulownia* excluded) of the Manual Range as presented in Gray, we find forty. The following eighteen genera of Gray are unchanged in both name and circumscription: *Verbascum*, *Antirrhinum*, *Collinsia*, *Scrophularia*, *Penstemon*, *Chelone*, *Mimulus*, *Limosella*, *Digitalis*, *Buchnera*, *Castilleja*, *Orthocarpus*, *Melampyrum*, *Euphrasia*, *Odontites*, *Pedicularis*, *Rhinanthus*, *Schwalbea*.

One genus is a new arrival in the region: *Mazus*.

Five genera have had changes of name: *Conobea multifida* (Michx.) Benth. does not belong to the tropical genus *Conobea* Aubl. It becomes *Leucospora multifida* (Michx.) Nutt. *Ilysanthes* Raf. becomes *Lindernia* All. "By the union of the four-anthered *Lindernia* All. and *Vandellia* L. with the two-anthered *Ilysanthes* Raf. and *Bonnaya* Link & Otto is formed a large and clearly natural genus." *Micranthemum micranthemoides* (Nutt.) Wetts. becomes *Hemianthus micranthemoides* Nutt. "The features of calyx, corolla and styles*** warrant generic status" (apart from *Micranthemum*). *Synthyris Bullii* (Eaton) Heller becomes *Besseya Bullii* (Eaton) Rydb., in accordance with the segregation made by Rydberg. *Seymeria macrophylla* is generi-

cally distinct, under the name *Dasistoma macrophylla* (Nutt.) Raf.

Five remaining genera have been divided as follows: *Linaria* Hill into *Linaria* Miller, *Kickxia* Dumort, *Cymbalaria* Hill, and *Chaenorrhinum* Reich.; *Bacopa* into *Bramia* Lam., *Hydrotrida* Small, *Macuillamia* Raf., *Herpestis* Gaertn., and *Pagesia*, Raf.; *Gratiola* L. into *Gratiola* L. and *Tragiola* Small & Pennell; *Veronica* into *Veronicastrum* Fab. (Leptandra Raf.) and *Veronica* L.; *Gerardia* into *Aureolaria* Raf. *Tomanthera* Raf. and *Gerardia* L. emend. Benth. The latter name is adopted according to the International Rules but under protest. It is noteworthy that only two of these, *Hydrotrida* and *Tragiola*, represent new segregations.

The author has examined the material in practically every herbarium of consequence in the country, and in several foreign institutions as well. Each specimen is cited in full, according to state, county, locality, collector, and number. These citations often occupy several pages and extend to several hundred specimens. Surely he has had ample opportunity to test and prove his taxonomic conclusions and the accuracy of his keys.

Many persons probably have the idea that *Verbascum*, with its five anthers and nearly regular corolla, represents a point of contact with the Solanaceae, and therefore the primitive genus of the family. Pennell, on the contrary, regards *Gratiola* and related genera as most primitive because of the separate stigmas and substantiates his view with geographical evidence.

The author concludes his work with a fifty-page discussion of the distribution of plants in eastern America, naturally supporting his views chiefly by the known range of the Scrophulariaceae. This chapter is too full of facts and theories to be capable of adequate review, but it amounts to an excellent résumé of modern distribution, migrations and geographical origin of our flora.

As an appendix, there is an alphabetical list of about a thousand collectors of Scrophulariaceae, naturally including a vast majority of all our field botanists, with dates of birth and death, their chief collecting regions, and the herbaria where their material is chiefly deposited.

The whole book is excellently printed, very free from typographical errors, and so practical that it will doubtless be a

part of the working library of every careful taxonomist. In its general concept and spirit it may well serve as a model for future systematic research.

H. A. Gleason

New York Botanical Garden

A new one-volume encyclopedia for gardeners[1]

All growers and lovers of plants will find this volume a treasure house of information. Every variety of plant cultivated in the United States for ornament or for food, as well as most others of economic importance and a large number of native wild flowers, trees and shrubs are given a place here. Arranged alphabetically, the plants are listed under both common and scientific names. For each plant there is a description concise but complete enough, especially as many are illustrated by excellent line drawings, following this are directions for cultivation, lists of fungus and insect enemies with methods of control, and brief descriptions of the species or varieties in cultivation.

Little is said of the parts of the country where different plants may be expected to grow, mention being made merely to hardy or not hardy north, needs much or little water, acid or alkaline soil, etc. Most of the book is of course taken up with descriptions of plants, but besides there are articles on almost any topic the gardener may desire to know about: injurious insects and insecticides; fungi and fungicides; special methods of propagation and culture; the construction of various types of gardens and green houses; kinds of soil and their treatment; fertilizers; dish, window and roof gardens and terraria; birds and their relation to the garden and farm; and a hundred other topics that may be of interest and value. Of birds, besides four and a half pages describing their value in the gardens and means of attracting them, nearly thirty of the more common ones of the east are briefly described in a table giving the characteristic color, markings, size, habits, habitats, nests, food and economic status. Under the last head it is said of the starling: "Highly valued as destroyer of harmful beetles and insects." Certainly there are parts of the country where the starling by

[1] *The Garden Encyclopedia*, edited by E. L. D. Seymour. W. H. Wise and Company, 1936. x+1300, 60 plates, numerous drawings. $4.00

its great numbers, its attacks on fruit, and its driving off of native birds, is not "highly valued." Weeds receive a somewhat similar treatment, a large number in tabular form, as well as separate treatment of most of the more important ones.

A suggestion of temporary value is given to the encyclopedia by giving names and addresses of the secretaries of such organizations as the Cactus and Succulent Society of America, the American Iris Society and the National Plant, Flower, and Fruit Guild. Surely the volume will be of value and use long after these organizations have changed their officers.

In any volume of the size and range errors are almost unavoidable. For example: "Angelica, a genus of herbs of the Paisley Family resembling the common cow parsnip or water hemlock, a species of Delphinium (which see)." Of course, there is reference to neither cow parsnip nor poison hemlock under Delphinium. Under "Nuts" there is given a botanical description and a horticultural one—but neither corresponds with the popular meaning of the term. A short list of true nuts and so-called ones, includes the brazil nut as one of the true ones, though it is really a seed. The scientific names used are the commonly used ones, a proper conservatism in a volume of this kind. Under Yucca we find "The great Yuccas of Southern California known as 'Candles of the Lord' . . . are *Y. arborescens*." This name is often used as a synonym for *Y. brevifolia*, the Joshua-tree correctly named in the same paragraph; the "Candles of the Lord" being *Y. Whipplei*. The statement that "snails, except the slugs with shells reduced to the vanishing point are of no interest to gardeners," will not be appreciated in some regions, such as Southern California. But in general one must hunt through many pages to find even such slight errors.

The book is plainly bound in dark green cloth, the 60 full page plates and the more than 500 text illustrations add to the value as well as to the attractiveness of the volume.

G. T. Hastings

FIELD TRIPS OF THE CLUB

Trip of September 15

The trip had as its announced purpose search for possible fern hybrids in certain swamps north and south of Newton, N. J. On this occasion the Torrey Botanical Club was joined by the American Fern Society, and the joint attendance, numbering 29, came from four or five states.

The Springdale region south of Newton was selected because of the collections made there by Dr. Philip Dowell some thirty years ago. Dr. Dowell had found two hybrids of *Dryopteris Goldiana* at this place—*D. Goldiana*×*marginalis* and *D. Clintoniana*×*Goldiana*. These were referred to in his article in the Bulletin of the Torrey Botanical Club, Vol. 35, 1908.

More recently Dr. Svenson had found a plant of the asplenioid hybrid, *Asplenium platyneuron*×*Camptosorus rhizophyllus* (Scott's Spleenwort).

The September trip was successful in finding a considerable number of the hybrid, *Dryopteris Goldiana*×*marginalis;* one isolated plant; and another group of thirty or forty plants in a few square yards. The Goldie hybrid with Clintoniana was not found on this occasion, but the region is well worth another visit. The swamp was located on the private property of Mr. Augustus Whittingham, to whom we are greatly indebted for permission to visit.

In the afternoon, a large humus swamp north of Newton was located—a place interesting for the way in which humus deposits are being "mined." One or two plants of the hybrid, *Dryopteris Bootii*, were added to the morning's find. The particular piece of swamp visited was very well guarded by a wide moat with a precarious bridge, and barriers of blackberry and catbriar.

In the report which is being published in the American Fern Journal, a complete list of those in attendance is included.

R. C. Benedict

Brooklyn Botanic Garden

Trip Through Fort Tryon Park, March 28, 1936

Twenty-one members and guests of the Torrey Club took the trip through Fort Tryon Park, commencing at the south

end, just above the 191st Street Station of the Independent Subway. This new park, estimated at from 50 to 60 acres, runs along the high rocky ridge which is the "backbone" of upper Manhattan, overlooking Riverside Drive and the Hudson River to the westward. The park ends at the northern terminus of Riverside Drive, where the latter comes in to Dyckman Street. The land was acquired about five years ago by Mr. John D. Rockefeller who, after having it landscaped, presented it to the City of New York as a park. The landscaping has been carried out in a most expert manner, and this, together with its natural advantages, makes the area without doubt one of the most beautiful parks in the eastern United States. About 1600 kinds of trees, shrubs, and herbs have been planted. In addition to these are a large number of rare trees, planted many years ago, and a wide variety of native trees and shrubs growing mostly near the north end, so that, besides its scenic charm, it contains an unusually comprehensive botanical collection. Furthermore, Fort Tryon itself, which was located at the highest point of the ridge, was an old Revolutionary stronghold.

On this particular Saturday, much of the Swiss Heath, (*Erica carnea*) along the "heather beds" was in flower; *Jasminum nudiflorum*, the Chinese Jasmine, which has been planted high up on rocky cliffs, showed pendent festoons of its flowers which mimic the Forsythia most convincingly with their shade of yellow; the Silver Maples had finished flowering, and the Red Maple buds were just ready to open. *Cornus mas* was just commencing to unfold its yellow flowers.

Among the other trees and shrubs seen were: *Ilex crenata*, *glabra*, and *opaca*, native Hackberries and Sassafras, *Pinus Strobus* and *Paulownia tomentosa*, the two last apparently planted long ago, *Carya cordiformis*, *Prunus avium*, and *Prunus serrulata* varieties (the Japanese Cherries), and *Buxus sempervirens*, the last housed during the winter in a burlap covering.

Arthur H. Graves

PROCEEDINGS OF THE CLUB

Meeting of January 15, 1936

The meeting was called to order at the New York Botanical Garden at 3:45 P.M. by Dr. H. A. Gleason, with 42 members present. The minutes of the annual meeting of January 7 were read and approved.

Miss Anna May Callan, 37 Washington Square, New York City, was unanimously elected to membership. The resignations of Miss Norine Boetsch of 29 Bronx River Road, New York City, and Mr. D. S. Carpenter, Middletown Springs, Vt., were accepted with regret.

Dr. J. K. Small of the New York Botanical Garden was unable to address the Club because of illness, but Dr. E. J. Alexander, Curator of the Local Herbarium of the Garden, gave an interesting and stimulating talk on the "Phytogeographical Regions Around New York." This address brought out clearly the lack of specimens in our herbarium from the Highlands of the Hudson River, Pocono Mountains of Pennsylvania, and the foothills of the Berkshire Mountains in Connecticut, and stimulated considerable discussion about the overlapping of phytogeographical areas and the need of more extended field trips into the less known regions to supplement our herbarium.

John S. Karling
Secretary

Minutes of Meeting, February 4, 1936

The meeting was called to order at the Museum of Natural History by Dr. M. A. Howe at 8:25 P.M. with 55 members present. The minutes of the previous meeting were read and adopted.

Mr. Rodney B. Miller, 46 Second Avenue, Newark, N. J., and Mr. Arthur B. Hillegas, 106 Morningside Drive, New York City, were unanimously elected to membership. Dr. Erwin H. Eames, 540 State Street, Bridgeport, Conn., who has been a faithful and worthy member of the Club for forty years, was elected to honorary life membership. Following the election of members, Dr. Alfred Gunderson, of Brooklyn Botanic Garden, gave a stimulating address on "The Structure and Evolution

of Flowers." His lecture was extensively illustrated by colored lantern slides and beautiful diagrams and drawings made by Miss Maude Purdy.

J. S. KARLING
Secretary

MEETING OF FEBRUARY 19, 1936

The meeting was called to order at 3:30 P.M. by Dr. M. A. Howe with 31 members present. The minutes of the meetings of December 19, 1935, and February 4, 1936, were read and approved. The following were unanimously elected to membership. Mr. Francis John Paladino, Miss Zaida Nicholson, Miss Iris Marjorie Campbell, Miss Ruth H. Kennedy. The following resignations were accepted with regret: Mr. Rheinhardt Heger, Jr., and Mr. Carl E. Bliss.

The minutes of the Council meeting of February 4 were read and approved with some slight alteration. The budget, submitted by the chairman of the Budget Committee was adopted.

The chairman of the Auditing Committee, Dr. B. O. Dodge, reported that the treasurer's books had been examined and found to be correct. Two letters from Doctors Hitchcock and Zimmerman and Doctor Eames expressing their appreciation and thanks to the Club were read by the secretary. The chairman then appointed committees for the year, these are listed on the inside of the back cover.

The scientific program consisted of two addresses, the first by Mr. R. Pratt of Columbia University on "The Growth of the Germ Tube of *Erysiphe graminis* in Heavy Water," and the second by Mr. Sydney C. Bausor on "Fasciation and its Relation to Growth."

The meeting was adjourned at 5:20 P.M.

J. S. KARLING
Secretary

NEWS NOTES

Professor Oake Ames, Supervisor of the Arnold Arboretum for the past eight years, and Professor J. G. Jack, connected with the Arboretum for nearly fifty years have retired. The staff at a recent meeting passed resolutions in appreciation of the men and their work.

A news release from the U. S. Department of Agriculture states that, as soy beans are being used in greater amounts for commercial purposes, it will be necessary in developing new varieties to consider the oil, protein, amino acids, lecithin, iodine, minerals, texture and other characters. Among the uses mentioned for the beans are flour, soy sauce, diabetic food, lard and butter substitutes, candies, health drinks, paint, varnish, glue, plastics, printing ink, linoleum, insecticides and glycerine.

Professor Fred C. Stewart, for thirty-seven years head of the division of botany at the New York State Agricultural Experiment Station at Geneva, will retire on July 1.

In order to increase the use of cotton in road building the Agricultural Adjustment Administration has announced the detailed specifications for bids for cotton mats and fabric. The exact amount to be purchased depends on the requests from the various states, but the amount authorized is 80,000 mats to be used in curing concrete roads, and 10,000,000 square yards of fabric, sufficient for 1,000 miles of road. The fabric is to be used in reinforcing bituminous surface highways.

Extension of the Dutch elm disease quarantine to include 26 new townships in New Jersey and 13 new towns in New York was announced on March 31 by Secretary of Agriculture Henry A. Wallace. This extension was made necessary by the finding in the new areas of a small number of trees which had become diseased. Any recent spread of Dutch elm disease which may have occurred cannot be definitely known until scouting starts again as the trees come into leaf, according to Lee A. Strong, Chief of the Bureau of Entomology and Plant Quarantine, who is in charge of the department's campaign to save the American elm from destruction by this disease.

A vegetable breeding laboratory, the first of its kind in the world, has been established by the U. S. Department of Agricul-

ture and 13 cooperating states near Charleston, S. C. "The purpose of the laboratory," says Dr. E. C. Auchter, principal horticulturist and assistant chief of the Bureau of Plant Industry, "is to breed high quality, disease resistant vegetables adapted especially to the southern states."

Vegetable varieties from this and other countries will be used in breeding work. To obtain hardy and disease resistant vegetables not found in this country as well as several other kinds of plants, expeditions under the direction of the Division of Plant Exploration and Introduction are en route to India and to Persia and Turkey. Excellent breeding materials have been obtained from these countries in the past.

An exhibit of about 200 dainty little alpine plants, all in bloom at the same time, was the Brooklyn Botanic Garden's striking contribution to this year's Flower Show. To their flowers most rock garden plants owe much of their peculiar charm and interest. Therefore, by skilful forcing or holding back, species that bloom normally from February to June all were brought into flower at once.

The forcing was done by placing the plants in a greenhouse for periods varying from two weeks to two months, and by increasing the length of day (for late-blooming kinds) by the use of electric light. The special lights were turned on at dusk and shut off at 11:30 P.M. Such additional lighting was necessary because a number of plants do not respond to the correct temperature unless it is accompanied by the augmented light of a longer day.

The appointment of Dr. Robert B. Gordon of the Botanical Department, Ohio State University, as new director for the Allegany School of Natural History, was made in connection with the announcement that July 5 through August 22 are the dates for the tenth season of the School. Dr. Gordon has been a member of the School's faculty during five of the nine previous seasons.

The School, which is called "The School in the Forest," is in Allegany State Park, New York, only 80 miles from Buffalo, and makes it possible for advanced students, and for beginners with little or no experience out-of-doors, to study under experienced naturalists in the field.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 62, published in 1935, contained 566 pages of text and 28 full-page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–62 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

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John Torrey, 1796-1873

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TORREYA

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The use of Myxomycete plasmodia for instructional purposes

W. G. Camp

During the progress of some studies on slime molds the writer has had opportunity to use the plasmodia for purposes of instruction in botany and biology classes. For studying the general characteristics and properties of protoplasm, and protoplasmic streaming, this material is, in my opinion, very much better than materials which have been commonly utilized for these purposes. This account of the writer's methods of collecting, preserving and preparing plasmodia for classroom use is presented with the hope that other teachers may find the information interesting and useful.

It is well known that the plasmodia of slime molds consist of naked, multinucleate, mobile masses of protoplasm which may be found inhabiting decaying wood and other organic matter. They are found most frequently in the warm seasons and in very moist or wet habitats. Those which inhabit rotting wood are usually found only in the interior of the wood while they are vegetating actively. Usually they emerge only at the time of fructifying. The plasmodia of many of the most common and widely distributed species are either pink or yellow and the fact that they are rather highly colored facilitates finding them on their natural substrata.

In collecting plasmodia it is well to be provided with a collecting case or vessel in which pieces of moist, rotten wood can be carried without danger of excessive drying. The ordinary vasculum serves the purpose very well. In addition to a collecting case, a hand-axe or some similar tool, with which decaying logs and stumps can be cut and broken, will be very useful. The writer has found plasmodia most frequently by examining the interior of stumps and logs located so that they are partially

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submerged in water or at least where they are kept more or less constantly moist. The reticulated plasmodia may be found penetrating and distributed throughout fairly large portions of the wood. Wood containing the protoplasmic reticulum may be cut or broken into pieces of almost any size, suitable for carrying in a collecting case, without danger of serious or permanent damage to the plasmodial material.

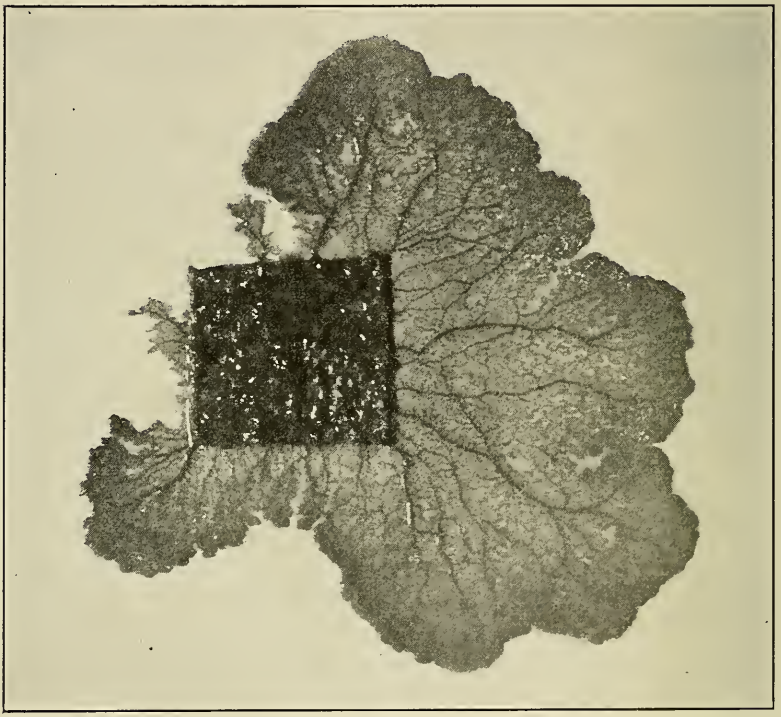

Fig. 1. A plasmodium in the process of emerging from a sclerotium and spreading over the surface of an agar plate.

Many living plasmodia, which have been collected in this way, may be kept in the laboratory for weeks or even months by simply placing the wood on which they are growing in a vessel where it can remain constantly moist. However, the habit of some of the Myxomycetes of forming sclerotia or resting stages can be utilized advantageously in preserving viable

material and obviates the necessity of culturing or maintaining vegetative plasmodia for future use. One convenient method of obtaining sclerotia is as follows: Place some decaying wood, in which a plasmodium is growing, on absorbent paper which can be moistened and kept moist. In the course of time, some part or all of the plasmodium will creep from the wood to the surface of the paper and after this has occurred the wood may be removed.

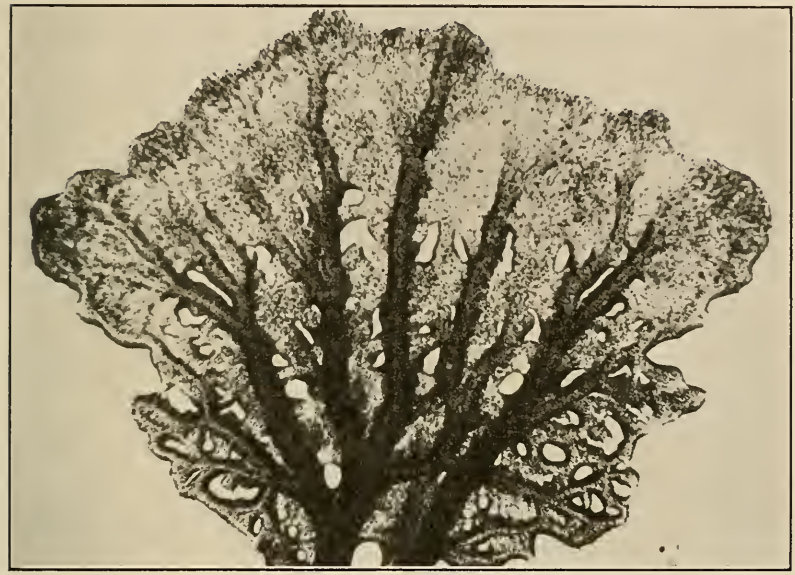

Fig. 2. A photomicrograph of a portion of a plasmodium showing the thick vein-like channels along which rapid protoplasmic streaming takes place.

Following this, the plasmodium is subjected to gradual dessication by leaving the paper to which it is clinging under a bell jar or similar vessel. This vessel should be provided with a small opening through which a slow exchange of gases can take place between the atmosphere of the vessel and the external atmosphere. The optimum rate of dessication is unknown but the writer has found it effective to allow about twenty-four hours for completion of the process. If dessication is too rapid horny non-viable masses are formed. In the process of sclerotization plasmodia collect into more or less compact masses and cleave into roundish or polyhedric cells. When fully formed, the sclerot-

ial masses are hard and brittle and they may be broken into small pieces without danger of damage. When afforded proper conditions of moisture and temperature living plasmodia will emerge from sclerotia or sclerotial fragments.

In preparing material for class use the writer places pieces of sclerotia on the surface of one per cent, non-nutrient agar which has been poured into petri dishes. At room temperature plasmodia emerge from the sclerotia within a few hours (fig. 1). The lids of the petri dishes may be removed for periods of several minutes without risk of excessive drying and the plasmodia can be examined and observed both with and without a microscope.

As observed with the unaided eye plasmodia can be seen to change their position on the substrata and their conformation more or less continuously. Thus it is seen that they are endowed with powers of locomotion and exhibit a creeping movement. As viewed with a microscope, they are seen to consist of granular protoplasm containing numerous inclusions and vacuoles. This protoplasm exhibits a systemic circulation but the protoplasmic movement is most noticeable in the thicker channels and veins of the plasmodial sheet or reticulum (fig. 2). Through these veins and channels the protoplasm streams in a very rapid current which gradually comes to a pause in the space of a short time, and then immediately reverses its course. A rhythmic backward and forward flow is thus maintained, but it can be observed to flow longer in one direction than in the other. The flowing movement is generally of longest duration in the direction in which the plasmodium is creeping.

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The flora of the Watchung Mountains

Harold N. Moldenke

Part I—Geology of the Region*

Five phytogeographic provinces are represented in the Local Flora area. The area is therefore the most complicated, physiographically and phytogeographically, of any similar-sized area in all of North America. This fact must be borne in mind when one studies the flora of any part of the local area, such as that of the Watchung Mountains.

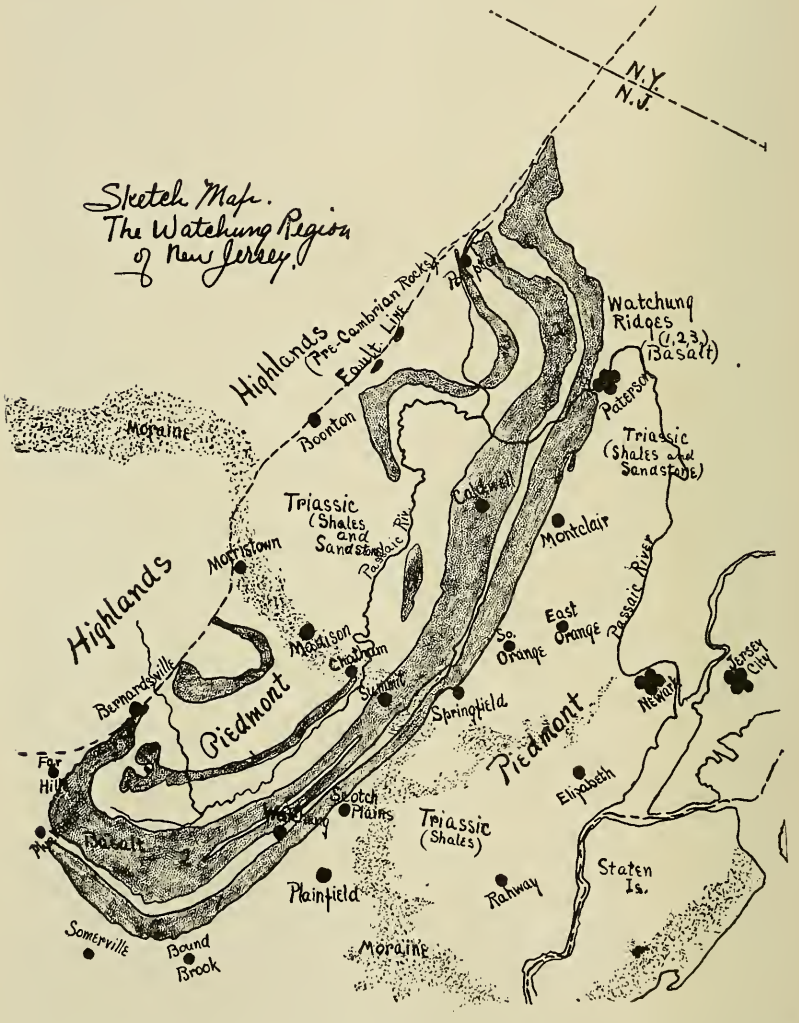
The Watchung Ridges (as they are termed by geologists) or Watchung Mountains (as they are known locally) are three in number.[1] Of these the longest is the First Watchung, which is also the farthest east. It is approximately 50 miles in length, through eastern Passaic Co. and western Essex and Union Cos., forming a bow-like curve from western Bergen Co. on the north, terminating in northern Somerset Co. It passes through Paterson and just west of Orange and Plainfield, and at Bound Brook turns sharply westward to Pluckamin. The Second Watchung parallels the First, only a mile or so westward, and separated by a belt of red sandy shales forming the shallow Washington Valley. It runs through Little Falls, Caldwell, and Summit, and in northern Somerset Co. swings sharply to the west and then north, terminating at Bernardsville. The so-called Third Watchung is really a series of 4 disconnected ridges closely parallel to the First and Second, but lower and separated by a narrow red sandstone belt. Still farther westward, wholly in Morris Co., is a fourth ridge, very small and crescent-shaped.

The Watchung Mountains are in general about 500 or 600 feet high—the highest point being High Mt. (876 ft. above sea-level) just north of Paterson in the Second Watchung. All four series of ridges lie within the so-called Piedmont physiographic and phytogeographic province and are made up of volcanic rock (basalt), with, in a very few isolated spots, narrow intervening bands of red sandy shale of the same sort as makes up the valleys between them. They are of Triassic age. They

* Part 2 of this paper, on the plants of the region, will be printed in the next number of Torreya.

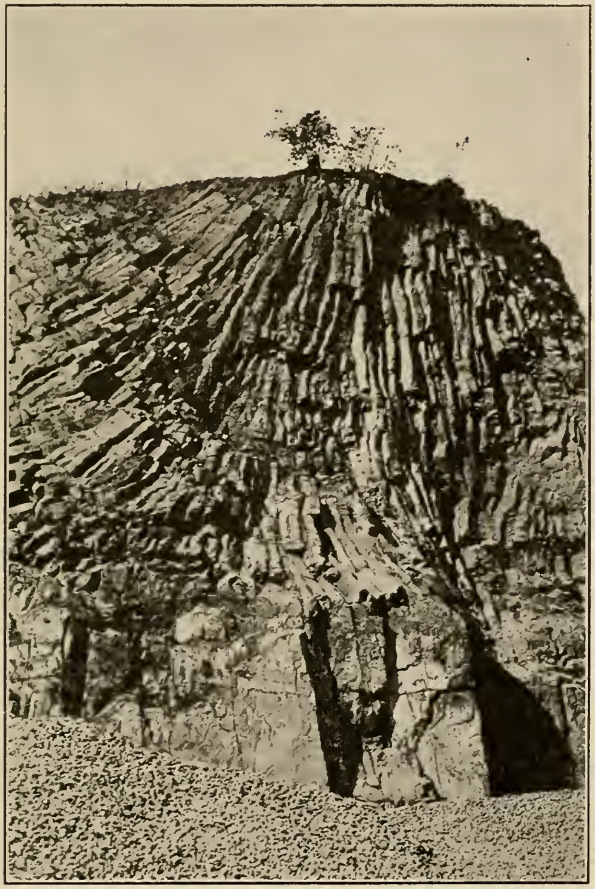
[1] The author is deeply grateful to Dr. B. T. Butler, head of the Department of Geology at the College of the City of New York, for the copious help given him in the preparation of the geological portion of this paper.

are bounded on the east by the Coastal Plain province, which is composed of more recent geologic formations (from the Cretaceous to the present). The Piedmont province is of older rock



structure, considerably planed down, and underlying the Coastal Plain sediments. The northernmost portion of the Piedmont section is known geologically as the Piedmont Lowlands and is of Triassic age, composed of red sandstones and red

shales, with igneous intrusions like the Palisades and the trap ridges at Princeton and Hopewell and along the Delaware River, and the Watchung ridges. The Piedmont plains are usually 100 or 200 feet above sea-level, somewhat higher in the



First Watchung Mountain: quarry West Orange—showing columnar structure.

north. Westward and northward of the Watchung Mountains lies the so-called New England province, composed of geologically very old rocks (schists, gneisses, and much granite intrusive), all Pre-Cambrian and underlying the other two provinces. Two prongs extend southwestward from New Eng-

land, separated by the Piedmont region. The eastern of these (Manhattan Prong) forms Manhattan Island; the western (Reading Prong) runs in a narrow belt across New Jersey (Sussex, Passaic, Morris, Warren, and Hunterdon Cos.) to Reading, Pa. The New Jersey Highlands and Ramapo Mountains lie in this prong. It is separated from the Triassic Piedmont to the east by a gigantic fault scarp. This fault was doubtless begun during the Appalachian Mountain revolution and formed the western edge of a large arid or semi-arid valley which, through erosion from the mountains to the east and west, filled with sand during the Triassic. The flows of lava which now form the Watchung Mountains doubtless came up along this fault and spread eastward over the valley of sands. There were a number of lava flows, all in late Triassic time. Both the First and Second Watchungs are made up of several separate lava flows, those of the First being the oldest. In some cases (like Eagle Rock and Garret Rock) the lava seems to have come up through vents. Several large volcanoes were located along the fault line during this time. The climate was generally cool. Fossils of a few small fresh-water fish and some fragments of land plants have been found. The fern fragments seem to indicate that they were washed in by floods from the surrounding mountains. Cycads were common and there were a few lingering pteridosperms. Some of the so-called algae described from the region are not plants at all, but are merely ripple-marks. They are commonly found in the old shallow lake-beds along with abundant mud-cracks, attesting to the arid or semi-arid climate. It was the early reptilian age, marked by the rise of dinosaurs. Footprints of small dinosaurs are commonly found through the region, mostly of the 3-toed, bird-like, carnivorous species, which fed upon one another. The mountains surrounding this vast sandy valley may have been *sparsely* covered with vegetation. The preceding geologic period had been very cold and characterized by many vast glaciers which certainly exterminated all the early plants of the region. The vegetation, however, gradually came back during the Triassic and Jurassic, so that in Cretaceous time there was an abundant flora over the area, including grasses and primitive dicotyledons. In the Triassic, conditions here were similar to those in valleys in the West today. Heavy rains during the winter washed much sand

and gravel, often with plant fragments, into the valleys from the mountains. There were some small lakes, and a few intermittent streams existed, but there was apparently no large river in the entire area that is now New Jersey, and the Watchung region had no outlet to the sea.

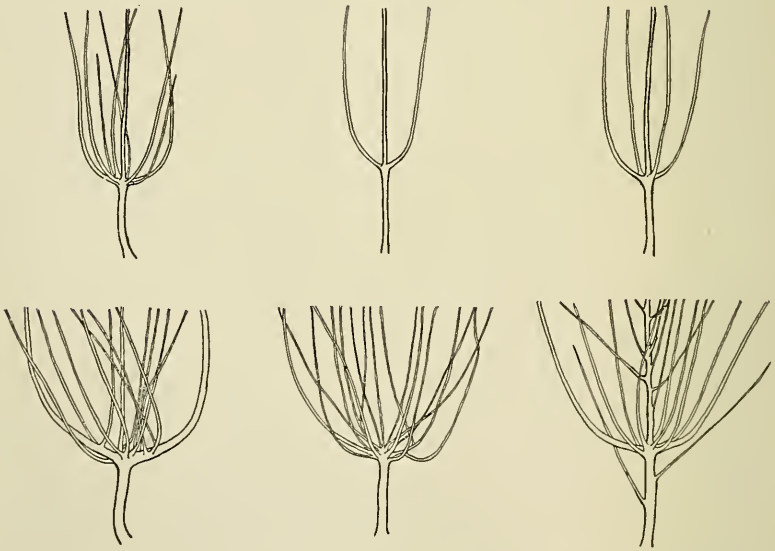
After the Triassic lava flows had quite ceased, the intrusive diabase masses forming the Palisades and similar southern ridges were pushed up between the hardening sandstones. During the Jurassic the whole area was lifted up, probably into low mountains, then subjected to erosion and planed down during the Cretaceous (since late Cretaceous deposits overlay the Tertiary in southern New Jersey). During the Jurassic climatic conditions were changed until they became more as they are today. No fossils are known from the Highlands rocks, but in the Cretaceous beds they are numerous.

In Tertiary time the Atlantic transgressed over the entire state of New Jersey (and New York up to the Catskill area at least). Fossils from beds of this period represent a wholly marine fauna, with shells and corals much like the modern ones. In the Pleistocene came an uplift of the region and active planing down of the land through erosion of the softer sandstones and shales, leaving the harder igneous ridges (such as the Watchungs) exposed. This was followed by the southward advance of the glaciers, with their accompanying glacial climate —the ice extending as far south as Staten Island. The terminal moraine runs just east of Plainfield, through the First Watchung at Scotch Plains and through the Second Watchung at Summit, then through the northern extremity of the southernmost ridge of the Third Watchung to Madison and Morristown, just north of the fourth ridge. The retreat of the glaciers left, just north of the fourth ridge and west of the Third Watchung, the old glacial Lake Passaic, of which the lake-bed can still be plainly discerned. We see, thus, that approximately the northern two-thirds of the First, Second, and Third Watchungs were glaciated in the Pleistocene and the southernmost one-third not glaciated. The fourth ridge was entirely unglaciated.

Growth form of Linum grandiflorum changed by X-radiation

Edna L. Johnson

Plants which exhibit changed growth form in response to X-ray treatment in the seedling stage vary in the character of the type of branching which occurs. Tomatoes assume a more bushy form because of the greater development of lateral branches. This is true also for certain members of the Pink and Evening primrose families. Other species such as the castor-oil plant and sunflower are prone to show dichotomous branching. *Linum grandiflorum* and *Linaria maroccana* when treated in the seedling stage develop, as compared with the controls at maturity, a greater number of main branches from the crown; secondary branches at the bases of the main ones also occur in greater abundance.



Lower portions of plants of Linum grandiflorum, the scarlet flax, to show nature of branching. Above, controls; below, plants whose seedlings had been exposed to one medium dose of X-rays. Note that the main central stalk has, in two plants, been replaced by numerous branches. Greater production of branches by the central stalk of rayed plants was noticeable in two groups of Linum grown to maturity.

In the first group of Linum plants studied, the average number of main branches of the X-rayed plants was exactly twice that of the controls. Representative specimens of the group portrayed in the figure exhibit the two most outstanding features of the treated plants: a greater number of branches sent up from the crown, and increased development of secondary branches from the central stalk. It is apparent that the main central stalk, in certain plants, was replaced by numerous branches of apparently equal size.

In the second study of scarlet flax, seedlings 15 days old were irradiated for 20 minutes with the following "set-up": 91 K.V., 5 ma., distance 30 cm. A careful analysis of the measurements taken at maturity made clear the fact that the decrease in total height of the treated plants was caused by lessened growth of the central stalk up to the point where it divided to produce the terminal branches rather than to reduced

Growth of Linum grandiflorum (Group II) after X-radiation
(15-day-old seedlings were treated with 1 dose from machine with "set-up": 91 K.V., 5 ma., 30 cm., 20 min.)

	Control	*Irradiated*	*Percentage difference in treated plants*
No. of plants	15	15	
Average height of plants (in cm.)	39.5	33.5	−15.2*
Central stalk			
Av. length to point of division into terminal branches (in cm.)	28.5	22.7	−19.5
No. of terminal branches	43	44	+2.3
Av. length of terminals per plants (in cm.)	30.4	33.6	+10.5
Percentage of plants bearing laterals on central stalk	53.3	86.7	+62.7
Av. no of lateral branches	1.9	4.0	+110.5
Av. length of lateral branches (in cm.)	6.9	26.1	+278.2
Average number of branches other than on central stalk	14.7	14.5	−1.4
Av. no. of days before blossoming occurred	124	126	+1.6
Av. no. of fresh blossoms at close of experiment (165 days)	7.3	6.9	−5.5

* The minus sign indicates that the treated showed less growth than the controls; the plus sign that they exhibited greater growth.

growth of the terminal branches. The average length of the central stalk was decreased 19 per cent while the terminal divisions were increased 10 per cent over those present in the controls.

The growth form was greatly changed by the increase in the development of branches from the central stalk. Eighty-seven per cent of experimental plants bore laterals on the central stalk as contrasted with 53 per cent of the check plants. Not only did the number of laterals on the central stalks of the former average twice as many as on the controls but their average total length per plant was almost four times as great. The number of branches other than those from the central stalk was practically the same in the two groups.

Blossoming was slightly retarded in the treated specimens. In the first group particularly, the treated plants looked unusually handsome because the flowers on the numerous branches all blossomed at about the same time.

University of Colorado
Boulder, Colorado

The status of Tiarella macrophylla Small

Olga Lakela

Dr. John K. Small in 1903 described *Tiarella macrophylla* as an additional eastern representative of the genus.[1] The curious fact that no plant has since been found to answer this description has been of prolonged interest to the collectors of the region. Dr. Small himself makes the following comment[2]: "It is impossible to tell whether this species is starting on its career or if its restricted range is the remnant of a former wider distribution."

In connection with a monographic study of the genus *Tiarella* now under way, the writer has examined the type specimen of *T. macrophylla*, through the courtesy of the New York Botanical Gardens where it is deposited. The specimen was collected by A. M. Huger, 1896, on Tryon Mountain, North Carolina. It is small wonder that it has never been duplicated, since upon careful study it has been found to consist of the basal leaves of *Heuchera villosa* and the flowering stems of *Tiarella*.

On the sheet are an entire flowering stem bearing cauline leaves, and a part of another inflorescence, both in fruit and flower. The cauline leaves attached to one of the inflorescences are typical leaves of the southern form of *T. cordifolia*. Neither runners nor attached basal leaves are present. The two detached basal leaves, the only ones on the sheet, each with the base of the petiole broken off and missing, are obviously the leaves of *Heuchera villosa* with which they agree, not only in morphology but in the anatomy of the petiole, which is very different from anything found in the genus *Tiarella*.

According to the International Rules, a name is to be rejected when it is based on altogether incoherent elements. *Tiarella macrophylla* Small seems completely to fulfill this requirement.

University of Minnesota
Minneapolis, Minn.

[1] Flora of the Southeastern United States. p. 502. 1903.
[2] Manual of the Southeastern Flora. p. 594. 1933.

Tilden's "The Algae and their Life Relations"[1]

Professor Tilden, who is well known to students of the algae through her monograph of the "Myxophyceae of North America and Adjacent Parts" and other important works, has recently published her *magnum opus* under the above title. It is designed especially to give students an outline of the fundamentals of phycology, and the term "algae" is interpreted in its broadest sense, including the Blue-greens (Cyanophyceae) and Yellow-greens (Chrysophyceae), as well as the Greens, the Browns, and the Reds. A geological time-table, showing the supposed sequence of the larger groups of algae, with the Cyanophyceae the oldest (early Archaeozoic) and the Chlorophyceae the latest (Proterozoic), and showing also the sequence of the higher groups of plants, occupies the frontispiece. The author considers the development of the main lines to have been, for the most part, parallel rather than branching and tree-like.

A general work of this kind can hardly aim to be complete in its references to genera and species, but most of the larger and more important genera are briefly described and many of them are illustrated. While the author appears to be usually accurate and up to date in discussing the general morphology and cytology of the algae, the reader may be a bit surprised to find her writing of *Caulerpa* "method of reproduction unknown," when the presence of swarmers in *Caulerpa* was announced by Dostal as early as 1928. This was confirmed by Schussnig in 1929, by Ernst in 1931, and by Iyengar in 1933, the later observers noting two sizes of the supposed gametes.

The bibliography, though occupying 23 pages of small print and seemingly very full, shows several curious lacunae. Thus J. Agardh, whose books and papers on the algae include more than 40 titles and who is one of foremost writers in this field, is wholly missing in the list, and his distinguished father, C. Agardh, is represented only by the first part of the first volume of his classic "Species Algarum." Also, the names of Montagne, Schmitz, and Foslie, each with numerous important papers to his credit, are among the missing. Bornet & Thuret are repre-

[1] Tilden, Josephine E. The algae and their life relations. 8-vo. Pp. i–xii +1–550. *f. 1–257+pl. 1–9.* 1935. The University of Minnesota Press, Minneapolis. Price $5.00.

sented by their "Notes algologiques," but not by the classic folio "Études phycologiques." Gardner appears only through his coöperation with Setchell, Wille's numerous and important contributions are represented only by a four-page paper, and Mme. Weber-van Bosse's principal work, her 535-page, beautifully illustrated quarto, "Liste des algues du Siboga" is omitted, as is also Sirodot's monograph of "Les Batrachospermes," with its 299 quarto pages and 50 plates.

An expression that will mystify both amateur and professional mathematicians occurs in connection with magnified figures published on several of the later pages of Professor Tilden's book, as on page 498, where it is stated that the figures are "×1000. The true measurement was multiplied by 5 mm." Whether "the true measurement" was in millimeters, lines, or what-not, the orthodox arithmetician will find difficulty in multiplying it "by 5 mm."!

The chapters on "Algal Food of Animals" and "Marine Algae, Our Richest Source of Vitamins: Algae as Food for Man" will prove of special interest, both to the botanist and to the layman. Some of the paragraphs of these chapters are quoted below:

"Although it is not generally recognized as a fact, it is the algae of the ocean, consisting of both attached seaweeds and plankton forms, that constitute the basal link in the food chain of all our important food fish. These in turn are consumed by man, who forms the terminal link in the chain.

"That animals are not able to manufacture food is a matter of common, but generally neglected, knowledge. Plants are the only organisms able to perform that function. *Marine algae, then, must manufacture all of the food consumed by marine animals.* When one stops to consider the countless numbers of creatures—ranging from microscopic organisms to huge monsters—which swim in the sea, when one contemplates the sum total of energy expended by these animals and the amount of food required to supply this energy, it seems incredible that all the proteins, carbohydrates, fats, and vitamins had their origin in the microscopic cells of marine algae. This, however, is a fact, a fact that demands attention. It is time that the primary links of the food chain receive due recognition. The algae, and the animals which feed directly upon algae, should be studied with all possible care, both as a scientific problem and as a basis for practice."

"Since the marine algae are even richer in iodine and some of the other food factors than are marine animals, they especially should be in human diet. The writer had the good fortune to live for a time in Tahiti while the natives were still living on a diet consisting largely of fruits, vegetables, and sea foods, including marine algae, or *rimu*. The people were vigorous in body and mind, handsome and healthy, and they had perfect teeth. Another visit to the island was made after pastry shops and ice-cream wagons had been introduced into this paradise. The bad effects of the foreign diet were already apparent. Tahitian children today have soft, crumbling, and badly decayed teeth.

"From time immemorial marine algae have formed a very important part of the food of the Japanese people. At present perhaps six or seven different kinds of seaweeds are used at a single meal. Goiter is unknown in Japan. Without doubt the hitherto almost national diet in Japan, consisting of rice, fish, and seaweed, has had much to do with the good health, and the consequent high degree of general intelligence and unusual artistic, literary, and scientific attainments of this race. Among the people of China the same thing is true. In the 'extraordinary physical capacity and endurance of her people there is the physical basis of their success throughout the ages'."

"Already two or three firms in the United States and one in England are selling seaweed products made from the large kelps under special trade names. One marine plant consisting of the fronds of the large kelp *Macrocystis pyrifera* (L.) C. A. Agardh, processed in such a way that its valuable minerals are preserved, has been thoroughly investigated by chemists and its effects checked by physicians. This dried kelp is found to contain iodine, iron, copper, calcium, phosphorus, sodium, potassium, magnesium, sulphur, manganese, aluminum, zinc, and chlorine, with traces of other elements. It is also a good source of vitamins B and D and an excellent source of vitamins A and E. (The fresh seaweed of course possesses vitamin C.) No other known food contains such a wealth of minerals and vitamins."

The illustrations are generally excellent, the press work is good, and, withal, Professor Tilden's book seems destined to play an important part in popularizing the study of the algae.

MARSHALL A. HOWE

New York Ferns[1]

Following Dr. Small's Ferns of the Southeastern Flora this volume is the second in a series which may in time cover the entire United States. The area covered is known to the members of the Torrey Club as the Local Flora Area, the region within one hundred miles of New York City. Fifty-eight ferns and thirty-two of the fern allies—horsetails, club mosses, quillworts, and floating ferns—are described. For each, except some of the quillworts, there is a full page plate showing the habit of the plant with sketches of pinnae or pinnules enlarged to show details of the veins and sori. The drawings are all clear and in most cases show the characteristics of the fern so well that accurate identification of the species can be made from them without reference to the text.

Following an introduction of 14 pages in which the area is divided into major and minor regions with the ferns characteristic of each listed, comes a series of keys to the orders, families, tribes and genera. Unfortunately there are no page references with the keys, so that after having determined the genus by aid of the key one must thumb over the pages hunting, or use the index. In genera with two or more species keys are given. Genera and species are described fully. Following the descriptions is a paragraph giving something of the history of our knowledge of the fern, its relationships, habitats and adaptability to the garden. The scientific names used are those which were first applied to each. The genera *Aspidium* and *Asplenium* of the earlier authors have been divided in an attempt to "interpret the fern-plants involved in more simple or natural generic concepts." The smaller, non-evergreen shield ferns with simple or 1-forked veins are put in the genus *Thelypteris*, the evergreen species—the marginal, crested, spinulose, etc.—in the genus *Dryopteris*. The spleenworts now are in four genera, the small evergreen species—wall-rue, maiden-hair spleenwort, ebony spleenwort, etc.—are still *Asplenium;* the lady ferns—both upland and lowland are recognized—are in the genus *Athyrium;* the silvery spleenwort is now *Diplazium acrostichoides;* and the narrow-leaved spleenwort had had a new genus, *Homolosorus*,

[1] *Ferns of the vicinity of New York*. John Kunkel Small, 1935, The Science Press, 285 pp. 85 plates. $2.50.

made for it by Dr. Small and becomes *H. pycnocarpus*. Exactly half of the names used for the ferns, and a much larger proportion for the fern allies are those used both in Gray's New Manual and in Britton and Brown's Illustrated Flora. And of the others at least one half are the names used in one or the other of these works.

In an effort to make the book useful to the beginner in fern study not only have the keys and descriptions been made as simple as is consistent with accuracy, but Anglo-Saxon terms—such as leaf and petiole— are used instead of the terms of Latin or Greek derivation, such as frond and stipe. The amateur fern student, however, may object to the common names of the ferns being given inconspicuous places at the end of the formal descriptions. We note, too, that in the descriptions of Salaginella and Isoetes the terms antherids and archegons are used but under Salvinea the terms antheridia and archegonia—the latter forms are the only ones used in the glossary.

At the end of the book there is a Taxonomic List of the different names given each fern, with the places of publication and the dates, a Comparative List of the names in this volume and in Gray's Botany and Britton and Brown's Flora, a list of Authorities Cited, a Glossary and the Index.

George T. Hastings

FIELD TRIPS OF THE CLUB

Trip of March 22, to the Pine Barrens at Lakehurst, Vicinity of Wrangel Brook

Each trip through the Pine Barren Region of southern New Jersey has brought to my attention traces of the successive inroads that civilization has made in exploiting this area.

The first settlers who touched the western edge of the Barrens were the Swedes who came in 1638 to establish trading posts. About this same time the Dutch had received grants in the Cape May Peninsula and had commenced to clear acreage for farms. With the surrender of New Amsterdam in 1664, a large influx of English settlers came from Connecticut and Massachusetts to settle the coast at Tuckerton, Barnegat, and elsewhere.

Before the year 1700 thriving villages along the Delaware and the coast sought communications across the Pine Barrens. An old Indian trail which started from Great Egg Harbor and followed the river northwestward and then to the Delaware was used by the early surveyors and timber cruisers. One of the first routes opened by the whites extended from Barnegat through Cedar Grove and South Pemberton to Burlington on the Delaware.

In those days the Pitch Pine grew to 75 feet in height, while now, chiefly due to repeated fires, it seldom reaches 50 feet. The White Cedar, due to its lightness and durability, was timbered to such an extent in the Cape May section that Benjamin Franklin in his Poor Richard's Almanac in 1749 advocated judicious reforestation. Yet even today white cedar is cut for local consumption.

The damming up of streams to make cranberry bogs materially affected the flora. The natives also found that nurseries were a ready market for dried sphagnum moss to use as packing material.

At one time American Holly was carted away by the crate for Christmas greens as was also Laurel, and Mistletoe. When in bloom Water Lilies, Sweet Bay, Arbutus and the Pink Azalea suffered depredations.

Finally we came to the real estate promoter who slashed out huge developments with avenues and streets, labeling them

with inviting names. But today the Pitch Pine fills the streets, covering up the scars, persisting in spite of the axe, fire and farming.

As the group followed the sand roads, there was ample evidence that the Barrens are still a retreat for wilderness lovers.

Buds of the following were studied: *Clethra alnifolia*, *Nyssa sylvatica*, *Magnolia virginiana*, *Azalea viscosa*, *Rhus vernix*, *Lyonia mariana*, *Vaccinium corymbosum*, *Comptonia asplenifolia*, *Sassafras officinalis*.

In low sandy ground the evergreen clumps of *Xerophyllum asphodeloides* were noted. Where the water table was just below the level of the ground *Kalmia angustifolia* and *Chamaedaphne calyculata* blanketed large meadows. In favorably exposed places the first buds of *Pyxidanthera barbulata* showed white. Blueberry buds were swelling; red maples opened to show their stamens and the buds of sweet bay had waxed fat with the lengthening days.

Lichens of the genus Cladonia had not reached maturity. *Cladonia papillaria* podetia appeared as whitish dots on the grayish green thallus. *C. verticillata*, *calycantha*, *fimbriata* and a new form of *caroliniana*, probably *prolifera*, were encountered in a cedar swamp. The tar-like patches covering the bare sand everywhere in the Barrens are a lichen, *Lecidea uliginosa*, later covered by sessile apothecia no larger than pinheads.

It seemed hardly possible that in the midst of such perfect isolation we were only 70 miles from New York.

George F. Dillmann

Field Trip of Saturday, April 18, to Site of Dr. John Torrey's Home, Palisades, N. Y.

About twenty members of the Torrey Botanical Club enjoyed an unusual field trip on Saturday, April 18, to Palisades, Rockland County, N. Y., to visit the site of the home occupied by Dr. John Torrey, about 1858, above the Palisades cliffs south of Sneden's Landing. This interesting excursion was offered through the hospitality of Mrs. Robert C. Hill, member of the club and active in the Garden Club of America, whose country home, Niederhurst, adjoins the estate of Thomas W. Lamont, which includes "Torrey's Cliff," above which stood

Dr. Torrey's house. Mrs. Hill's kind thought was relayed to the field committee by Miss Margaret McKinney, Secretary of the City Garden Club. Mrs. Hill fixed the date for April 18 because about three acres of "Dutchman's Breeches" *Dicentra Cucullaria*, on her own place and underneath "Torrey's Cliff" would then be in full bloom. So they proved to be, and an astonishing display of this plant they were, on the talus of the cliffs, running south from Niederhurst. None of the members had ever seen such a display of these plants, with their delicately divided leaves, and quaint, cream colored, white, or somewhat pinkish double spurred blossoms. They are protected by the situation, inaccessible from highways, from extermination.

Mrs. Hill persuaded her neighbor, Mr. Lamont, to call his whole estate of about 300 acres, "Torrey's Cliff," as it was known during Dr. Torrey's occupation, which seems to have been about 1850–1860 (?) before the Torrey family moved to Sterling, N. J., in Morris County. Mr. Lamont has Dr. Torrey's early botanical works in his library. Mrs. Hill led the party through her rock garden, where *Erythronium americanum*, *Claytonia virginiana*, and *Dicentra Cucullaria*, *Sanguinaria canadensis*, *Trillium erectum* and *Arisaema triphyllum* were in bloom together with interesting spring flowering exotics, along the cliff path to the great expanse of fully flowering Dutchman's Breeches. The path then climbed into Mr. Lamont's rock garden, near which, on a flat spot overlooking the Hudson, was the site of the house occupied by Dr. Torrey. Mrs. Hill has a photograph of it, which the field committee proposes to reproduce in the 1937 schedule. Thomas W. Lamont, 3rd, Mr. Lamont's grandson, a bright, handsome lad who is interested in natural history, became the leader here and took the party about the grounds above the cliff.

Returning to Mrs. Hill's home, some interesting blooming exotics were viewed, most striking being the Pacific Coast *Erythronium Hendersoni*, with mottled foliage like our eastern *E. americanum*, but with deep purple flowers; also *Scilla sibirica*, obviously well established and happy. Mrs. Hill has some fine trees, including a notable weeping beech. She entertained the party with tea, and a period of botanical talk ended a pleasant afternoon, an event which all concerned hoped may become an annual one in the field schedule.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

Meeting of March 3, 1936

The meeting was called to order at 8:30 by Dr. M. A. Howe, with 53 members present. The three following members requested transfers from regular to field membership, which were unanimously granted: Miss Mabel E. Newman, 3016 Bronx Park East, New York City; Mrs. Wm. Gavin Taylor, The Beechmont, Arlington, N. J.; Mr. Wm. Gavin Taylor, The Beechmont, Arlington, N. J. The resignation of Professor E. B. Babcock of the University of California was accepted with regret.

The scientific program consisted of an address by Professor E. B. Matzke of Columbia University on "Motion Picture Aids to the Teaching of Botany." The address was well illustrated with motion picture reels of various phases of plant life which are used in the botanical laboratories at Columbia for teaching purposes.

The meeting was adjoured at 9:45 p.m.

J. S. Karlwig
Secretary

NEWS NOTES

Mr. T. G. Harbison, curator of the herbarium of the University of North Carolina, died in January, He had collected extensively in the southeastern states, especially in the mountains of North Carolina, where he had made his home for nearly fifty years, and had published several articles in the Biltmore Botanical Studies and elsewhere. He described several new species, and had a few named for him.

The Allegany School of Natural History, in addition to the four regular seven-week college credit courses offered, plan a new popular course, "Afield With Plants and Animals," in units a week long for those with short vacations. This latter course will be given by Dr. Albert E. Shadle, of the University of Buffalo and Prof. William P. Alexander of the Buffalo Society of Natural Sciences.

The cypress swamp near Bucksville, Alabama, described by Dr. Roland M. Harper in Torreya of October-November 1934, has been recently lumbered and the best trees cut out. In his article Dr. Harper expressed the fear that lumbermen might invade this swamp. The fears have been realized sooner than expected.

During the latter half of April an exhibit of Colonial Folk Arts and Customs Pertaining to Plants was held by the National Committee on Folk Arts in the United States. The exhibit was arranged by Mrs. Alice Earle Hyde. It included 175 specimens of seeds of medicinal plants, pot-herbs and sweet herbs, each with an attractive painting of the flower and fruit. Among these are pure white closed gentian, Canadian thistle, and cardinal flower, each of which had been seen for several successive years by Mrs. Hyde. Other exhibits were a series of home-made wines—cherry, blackberry, grape, strawberry and elderberry; medicinal "herb-teas" from boneset, sassafras, Joe Pye-weed, wormwood, pumpkin seeds, etc.; "Meeting seed and Sabbath day nibblins,"—roots and seeds carried to church and nibbled during the long and often dreary sermons; sweet fern and cornsilk "smokings"; divining rods of apple, witch hazel and other woods; home made valentines of pressed flowers; and a variety of others.

The Grande Medaille a l'effigie d'Isidore Geoffroy St. Hilaire has been awarded by the Societe Nationale d'Acclimatation de France to Sir Arthur Hill, Director of the Royal Botanic Gardens, Kew, and to Dr. V. Van Straelen director of the Royal Museum of Natural History Brussels.

John F. Preston, forester for the Hammermill Paper Company, Erie, Pa., has been named head of the woodland management section of the Soil Conservation Service. Mr. Preston will supervise the forestry and woodland phases of the soil erosion control program now being carried on in 141 demonstration areas and more than 450 CCC camps throughout the country. He also will maintain cooperation with the Forest Service and other agencies interested in woodland work.

Dr. Edmund W. Sinnott, Professor of Botany at Columbia University, has been elected a member of the National Academy of Sciences. Among the fifteen scientists elected this year, Dr. Sinnott is the only botanist.

The western summer meeting of the Botanical Society of America will be held at the University of Wyoming Camp after the close of the Camp School on July 27. Information can be secured from Dr. Aven Nelson, chairman of the local committee, Laramie, Wyo.

Professor M. T. Munn has been put in charge of a new research division established at the New York State Experiment Station at Geneva. The new division is known as the Division of Seed Investigation and will have charge of seed inspection and of research into the physiology of germination, the problems of seed-borne diseases, and other problems connected with the growth of seeds.

Dr. Elmer D. Merrill, director of the botanical units of Harvard University, and formerly director of the New York Botanical Garden has been elected an honorary member of the Botanical Society of Japan. Dr. Merrill was also awarded the honorary degree of LL.D. by the University of California at the commencement this spring.

Mr. Henry Teuscher, dendrologist at the New York Botanical Garden for the past three years, has been made superintendent and horticulturist of the new Botanical Garden of Montreal, Canada.

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Of former volumes, 24–62 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

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Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

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Pollen in Hayfever*

R. P. Wodehouse

All true hayfever is caused by pollen. Now that this point is quite certain 'pollinosis' would be a more appropriate name for the malady, that is if one wishes to be strictly scientific and correct. But now that we all know that hayfever is not a fever and is not caused by hay there can be no harm in calling it hayfever. Indeed the term has the advantage of picturesqueness and falls into the same category as welsh rabbits, cow-catchers, and dog-tooth violets. Of course there are other substances which cause the symptoms of hayfever, such as orris root in face powder, box-wood sawdust of the jeweler, castor pumice used as fertilizer, or even ordinary wheat flour used in baking, but symptoms from these causes are by definition excluded and, anyway, they generally resemble asthma more closely than hayfever.

Since all true hayfever is due to pollen the malady follows the cycle of the seasons. First there is the early spring hayfever which comes, in the Torrey Club area and several hundred miles around in all landward directions, in the earliest spring, almost as soon as the frost leaves the ground. This is due to the early-flowering trees which take advantage of their leafless condition, perhaps also of the comparative scarcity of hungry insects, to scatter their wind-blown pollen. This is followed in May by the early summer type of hayfever which is called "rose cold," a practice which cannot be condoned because it sometimes leads the uninitiated to believe that roses have something to do with it. In reality it is caused almost entirely by grasses, helped a

* A second part of this paper, dealing with the structure of pollen grains will be published in the September-October number of Torreya.

little, perhaps, by plantain. Toward the end of July this type of hayfever gradually dies out as the common grasses begin to set their seed. Patients may even have comparative freedom from symptoms for two or three weeks, or until the middle of August when the third and worst hayfever season begins. This is of the type which is called "ragweed fever," and with justification because it is almost entirely due to the pollen of the ragweeds and their closest relatives. It goes on until all such weeds, dry up, as they often do toward the end of summer, or their flowering is stopped by an early frost.

These three seasons differ greatly in their relative importance. Early-spring hayfever is comparatively unimportant in the eastern part of the country, unimportant only because there are few cases, not because such are milder for they may be very severe. Among the earliest trees to flower in our region are the elms. Generally the first elm pollen may be detected in the air about the first of April, and very soon thereafter the elm-hayfever patients begin to have their troubles. Farther south where spring comes earlier the tree hayfever season also begins earlier. I once knew of an elm-hayfever patient who came north just ahead of the flowering of the southern elms, then returned south just ahead of the flowering of the northern elms. It was considered a very satisfactory way to spend a short vacation.

There are several other trees belonging to this very early period but of considerably less importance. Of these the willows begin to flower at about the same time as the elms, but they do not shed nearly so much pollen consequently they claim fewer victims and these are less affected, but their troubles may be greatly prolonged because there are so many kinds of willow flowering at different times that as soon as one kind has finished another takes its place. The season starts with the pussy willows as, for example, *Salix discolor* and *S. purpurea* flowering very early, generally in March much before the opening of the leaves. It is continued with the tree willows such as the crackle willow (*S. fragilis*) and the black willow (*S. nigra*) which flower either at the same time or just after the leaves unfold, continuing the season to nearly the end of May. Also belonging to the early season are the poplars. Though they shed excessive amounts of pollen, cases of hayfever from it are rare in the eastern states and generally of a mild character. The same is true of the

maples. They begin flowering in March or April with the silver maple, followed by the red, sugar, Norway, and three-leaved maples, ending up with the sycamore maple toward the end of May. Of all these, however, only the three-leaved maple is strictly wind pollinated, and it is the only one of which the pollen gets into the air in any great abundance. Perhaps this is why the maples claim relatively few victims during their exceptionally long flowering season.

The worst hayfever trees of all in the eastern states are the birches and oaks. They both flower in our region in May. The birches begin about the first of the month. Each species has only a short flowering period, lasting generally less than a week, but all together they extend through most of May. In our region the first to flower are the cultivated European birches, mostly *Betula alba*, followed by the native gray, yellow, and black birches (*B. populifolia*, *B. lutea* and *B. lenta*). Before the birches have finished flowering the oaks begin. All of the numerous species of oak that we have in our region flower at very nearly the same time so that the entire flowering period of the oaks lasts only about two weeks. This always occurs in May but varies with the season, sometimes beginning in the first week and sometimes the second. Both the birches and oaks are prolific pollen shedders. As a consequence their victims often suffer severely.

Before the tree hayfever season is over the late spring or early summer season begins, in our region about the first of May. This type of hayfever is almost entirely due to grasses and these, unlike the trees of the previous season, are so closely related that if a person is susceptible to the pollen of one he is likely to be susceptible to that of them all. The season is heralded in by the flowering of *sweet-vernal grass*. This is not quite the first grass to flower; the so-called annual blue grass (*Poa annua*) springs up from its roots of the previous season several weeks ahead of sweet-vernal grass, flowering sometimes even in March, but not until the sweet-vernal grass comes into flower do hayfever patients feel any discomfort from grass pollen. Toward the middle of May *June grass* and *orchard grass* begin to contribute their pollen to the air, and reach their maxima during the first week in June; these two grasses are accountable for nearly all the hayfever during the latter part of

May and the first part of June, after which they gradually go to seed. But before they have waned enough to permit much relief to hayfever sufferers *timothy* and *red top* take their place as pollen distributers. Starting during the last week in June, they reach their maxima early in July, begin to set their seed toward the middle of July and before the end of the month their pollen ceases to trouble the hayfever patient.

These five grasses, sweet-vernal grass, June grass, orchard grass, timothy and red top, probably account for nearly all the grass hayfever in the northeastern states, but there are a few others which, even though by comparison with these are of only secondary importance, deserve consideration. For example there is the red fescue which comes into flower at about the same time as June grass. It is a tough wiry little plant, unlike June grass, not at all particular where it grows; it is characteristic of dry sandy hills and impoverished soils. I have seen it in what appeared to be nothing but ashes seeming to rejoice in the total absence of competition. Then there is meadow fescue which is somewhat similar in appearance but grows only in rich moist meadows. Both these and some of the other species of fescue are prolific pollen shedders and would undoubtedly rank among the grasses of first importance in hayfever if they were more abundant. To this list should also be added quack grass, abundant enough it is true, but only a weak pollen shedder, the darnel and perennial rye grass which rank high as pollen producers but in most places not abundant enough to be very important. And there are many others still less important for, as we have seen, grasses are all grasses to the hayfever patient, their importance being conditioned by their abundance and their propensities for producing pollen. Each one helps the other in making life miserable for the hayfever sufferer and so much mixed up are they that the victim is at a loss to tell just where to put the blame.

English plantain (*Plantago lanceolata*) is a lone invader among hayfever plants. It sheds large quantities of light pollen during the latter half of May and most of June, continuing right to the end of summer in reduced amounts. Its pollen does not interreact with that of the grasses. That is to say, a patient may be highly sensitive to the pollen of grasses and not respond in the slightest degree to that of plantain, and vice versa. English

plantain has several relatives which are common weeds, for example, Rugel's plantain and common plantain (*P. Rugelli* and *P. major*) but these are far too chary with their pollen to ever be seriously considered as causes of hayfever no matter how common the plants themselves may be. Like the trees, English plantain claims but few victims but those it does are likely to suffer severely.

Most of the grasses mentioned above, all the worst ones, are grasses of agriculture, and plantain is a weed of agriculture, and so it has always been and always will be that man wherever he invades new territory takes his hayfever with him. In warm countries it is Bermuda grass, the worst hayfever grass throughout the south, and in dry places it is Johnson grass, a particularly bad hayfever plant throughout much of our middle west.

In the northeastern states after the flowering of timothy and red top there is relatively little pollen in the air and as the season advances hayfever patients may even enjoy comparative freedom from symptoms until the middle of August when comes the late-summer hayfever period. This begins in the Torrey club area almost exactly on the fifteenth of August, the cause, the tall and short ragweeds. The first flowers of tall ragweed open on about the first of August and the first of the short a week later, but not until the fifteenth do their combined efforts produce sufficient concentration of pollen to cause serious inconvenience to hayfever sufferers. The pollen is very light and of an extremely buoyant character so that as the plants continue to grow the air becomes more and more heavily charged with pollen. It has been estimated that over New York City the air carries several tons of pollen at the height of the season which occurs during the last week in August and the first in September. From this peak the pollen load of the air gradually declines as the ragweed plants go to seed but during September, before the ragweed pollen in the air has tapered off enough to bring much relief to the hayfever sufferer, the cockleburs begin to make their presence felt, for, on account of their close relationship to the ragweeds, their pollen is essentially the same in its toxicity to hayfever patients. At this time also the goldenrods offer their contribution. It is not much and does not usually count at all, except on gusty days, for its pollen does not have the buoyant character of that of ragweed, but it does have a

similar toxicity and sometimes adds a little to the troubles of the hayfever sufferer. Still, in spite of these additions, the load of toxic pollen in the air gradually tapers off, but does not actually reach zero until well into October, unless halted by an early frost.

In California and the southwestern states there is the western ragweed (*Ambrosia psilostachya*) similar in appearance to the eastern short ragweed. In the South, eastern Texas, and the lower Mississippi valley, is the western giant ragweed (*A. aptera*), and in the mid-western prairie states, Louisiana and eastern Texas, is the southern ragweed (*A. bidentata*). In Florida there is the coast ragweed (*A. hispida*) which, however, appears to be a negligible factor in hayfever. It is safe to say that not a state in the Union is entirely free of ragweeds. Besides this the ragweeds have a number of very close relatives which are essentially the same in their effects on hayfever patients. There is the genus called the false ragweeds (*Franseria*) so close to the true ragweeds in appearance that it is difficult to tell them apart. Two of these are counted as very bad hayfever plants; the bur ragweed (*F. acanthocarpa*) is a common weed almost throughout the Rocky Mountain states and westward to the coast range, and the slender ragweed (*F. tenuifolia*) is characteristic of the arid plains of our southwestern states from Kansas and Oklahoma to southern California. Still another genus, not quite so closely related to the ragweeds yet close enough to be nearly the same thing as far as the hayfever patient is concerned, is the genus of marsh elders (*Iva*). In the east we have a marsh elder common in tidal marshes along the Atlantic coast. In the Torrey Club area it is known as *Iva oraria*. It extends from Massachussets southward along the Atlantic coast. Somewhere in Virginia its name is changed and from there it extends on as *Iva frutescens* around Florida and along the Gulf coast. It causes little trouble to hayfever sufferers, none outside of the immediate vicinity of the tidal marshes, but its pollen reacts almost as violently as that of ragweed. The rough marsh elder is a real hayfever plant of our midwestern prairie states from Iowa and Nebraska southward, and the poverty weed (*I. axillaris*) is often a factor of importance throughout much of the huge region from southern Manitoba to Oklahoma and westward almost to the Pacific coast. Still another member of

this group of ragweed relatives is the prairie ragweed or "Burweedmarsh elder." Its correct name is *Cyclachaena xanthiifolia*. Throughout much of its range which extends from Michigan to Washington and southward to Oklahoma and New Mexico, it is as important a cause of hayfever as any of the ragweeds.

The ragweeds and their relatives constitute one of the 14 tribes of the composite family, the tribe most closely related to the sunflower tribe. The connection between these two tribes has been clearly established by George Bentham, the great English botanist of last century and the greatest student of the Compositae of all time. The complete interaction which allergists have found between the pollen of the two tribes, and the forms of their pollen grains proclaim their relationship. In fact the morphology of their pollen grains shows that the ragweed tribe may be regarded as a group of wind-pollinated derivatives of the sunflower tribe. In spite of this there is a tendency among modern botanists to treat the ragweed tribe as a separate family, misled, perhaps, by the extreme modification in outward appearance that these plants have sustained in response to wind pollination. This treatment is misleading to allergists because it removes the implication that the other members of the composite family should be regarded as potential hayfever plants, an implication that is abundantly sustained by experience.

Another large group of Compositae—but in another tribe, the Anthemideae,—is the group of sage brushes, wormwoods and mugworts (*Artemisia*). All of the many species of this huge genus appear capable of producing hayfever providing they are abundant enough and their pollen sufficiently copious. In the eastern states the few species of *Artemisia* which are found can never be counted as more than minor contributary causes of hayfever, but in the Prairie states and the Great Basin area, where several species are much more abundant, the sage brushes, mugworts and wormwoods are frequently primary causes of hayfever.

We have seen that all of the hayfever plants of this latter season belong to the composite family. As with the grasses, the ability to cause hayfever would seem therefore to be here a family character. But what of the other Compositae, the asters, daisies, coreopsis, thistle, and dandelion? We know that they

do not cause hayfever. The answer is found in their mode of pollination. There are two ways in which the majority of flowering plants are pollinated, viz. by insects (entomophily) and by wind (anemophily). Plants which are insect pollinated and perfectly adapted to this mode of pollination cannot cause hayfever. Thus the orchids, milkweeds, sweet peas, and many others of the more highly specialized flowers produce their pollen in such a way that it remains in the flowers until removed by the insect which is to carry it to another flower. But by no means all insect pollinated flowers are so perfectly adapted to entomophily as orchids, milkweeds and sweet peas. All stages of imperfection in this adaptation are found. For example, if a flowering branch of goldenrod is placed in water in the house, after a few days pollen will be found scattered on the table beneath the flowers. Out-of-doors this pollen, if not carried away by insects, is blown away and even at times may become a menace to hayfever sufferers; certainly it can easily be detected on pollen slides far from the flowering goldenrods. An oustanding example of imperfect entomophily is found in the willows. Some of the standard manuals of botany state that willows are wind pollinated others that they are insect pollinated. Both are right; willow flowers are brightly colored, sweet scented, provided with nectaries, and attract to themselves many insects which effectively carry their pollen from flower to flower; so they are insect pollinated. On the other hand their stamens are exserted and their pollen is not very sticky so that, if it is not removed by insects, it is easily blown away by the wind. Indeed willow pollen is often caught on pollen slides several miles away from flowering willow trees; so they are wind pollinated. Another example of such a dual method of pollination is found in the red maple which appears to be about equally wind and insect pollinated. The maples are not all alike in this respect. In fact the several species comprise a nicely graded series ranging from the Norway, Sycamore, and striped maples which are entirely entomophilous, through the silver, red and sugar maples which are both insect and wind pollinated, to the three-leaved maple (*Acer Negundo*) which is entirely anemophilous. As we pass along this series we note that the flowers become less showy and attractive to insects but produce more pollen and of a less sticky character. The flowers of the

three-leaved maple are drab colored and of no interest to insects but produce enormously more pollen than the bright yellow flowers of the Norway maple which are the delight of honey-gathering insects.

Anemophilous flowers may generally be recognized as such by their lack of attractiveness to insects. Thus the poplars, while closely related to the willows, are entirely anemophilous. Their flowers lack the sweet scent, yellow color and nectar of the willows, and are left severely alone by flower-visiting insects, but they produce enormously more pollen. The oaks, elms, birches, and, in fact, most of our forest trees are of this character. It is only among such plants with drab inconspicuous flowers that one need look for the real causes of hayfever.

It does not necessarily follow that all wind pollinated plants cause hayfever. This characteristic belongs only to relatively few families. Besides those already mentioned the family of the chenopods possess it to a degree; for example. Russian thistle is an important hayfever plant throughout much of the western part of the country. The closely related family of the amaranths also possess it; for example, the western water hemp in Oklahoma and neighboring states. The Knot-weed family possess it to a still lesser degree; for example, cases of hayfever from such wind-pollinated members as the docks have been recorded. On the other hand the cattails are among the most prolific pollen shedders, yet, I believe, no authentic cases of cattail hayfever have been recorded. Pine is the most universally abundant pollen in the atmosphere yet no cases of pine hayfever have ever been recorded. In fact none of the conifers or other gymnosperms, except Mexican cedar, seem to be capable of producing hayfever in spite of the fact that they are all outstanding practitioners of anemophily. Mexican cedar is a curious exception. It grows on the limestone hills of Texas and, flowering in December and January, is said to cause a severe type of winter hayfever in the city of Austin. It is a juniper (*Juniperus mexicana*), yet the several other members of the genus which are common almost throughout North America seem to be harmless to hayfever patients. In order to be a real cause of hayfever pollen must possess three characters: it must be buoyant and easily distributed in the air; it must be abundant; and it must be toxic.

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EXPLANATION OF PLATE I

Beginning at the top and following down to the bottom the grains are named and their diameters given in microns.

Top, left—Timothy, *Phleum pratense* L., 28.5

Top, center—Plantain, *Plantago lanceolata* L., 30

Top, right—Birch, *Betula alba* L., 26, polar view, drawn as if partly cut away to show optical section

Second, left—Oak, *Quercus alba* L., 34.2, polar view

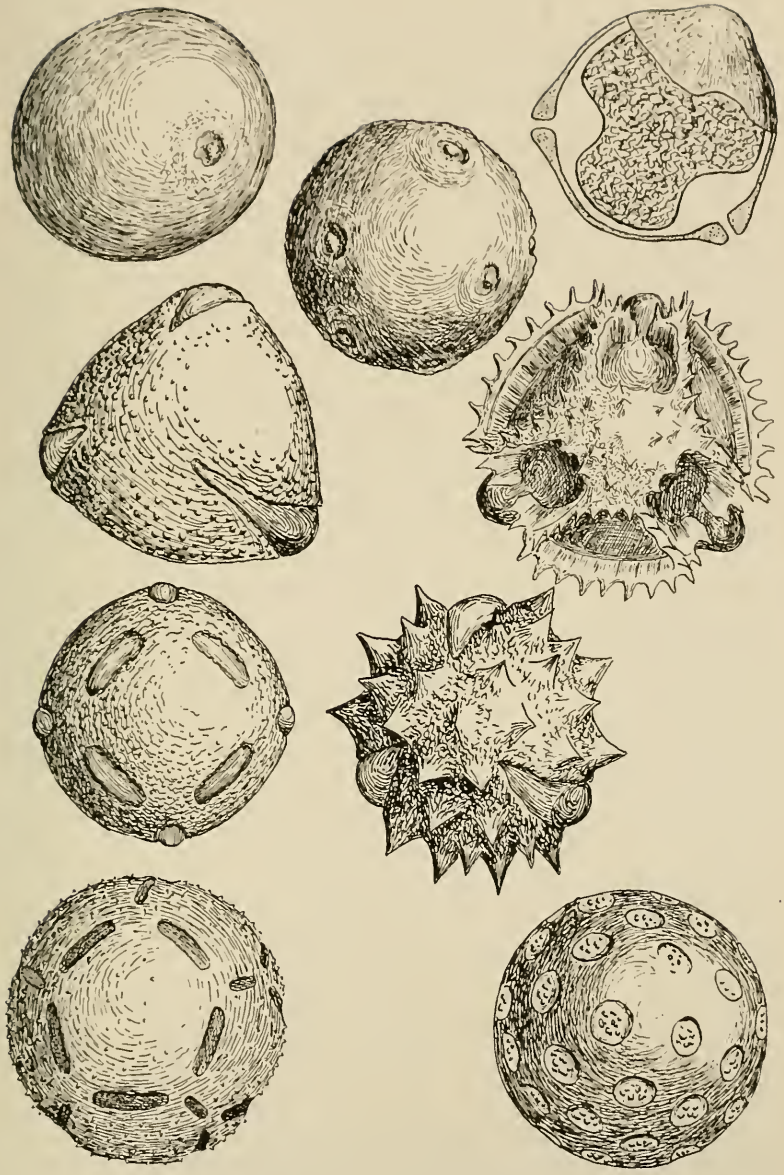
Second, right—Dandelion, *Taraxacum officinale* Weber, 34.2, polar view

Third, left—Carpet weed, *Mollugo verticillata* L., 32.3, showing four, and the ends of four more, of its twelve furrows

Third, right—Goldenrod, *Solidago speciosa* Nutt., 22

Bottom, left—Portulaca, *Portulaca grandiflora* Hook., 80.6

Bottom, right—Russian thistle, *Salsola Pestifer* A. Nels., 27.5



Wodehouse: Pollen Plate I

The flora of the Watchung Mountains*

Harold N. Moldenke

Part II—The Flora

The Watchung Mountains, lying wholly within the Piedmont phytogeographic province, whose geologic history we have just reviewed, have a native flora which is, on the whole, quite characteristic of this province, although doubtless the close proximity of four other important phytogeographic provinces, viz., the Coastal Plain, the New England, the Appalachian Valley, and the Appalachian Plateaus, has aided materially in building up the remarkably rich flora which is to be found in these hills. Far greater contributions, however, have come due to the proximity of the area to the port of New York City, through which so many scores of foreign plants have entered.

Very representative of the region is the flora of that part of the Watchung Mountains at the town of Watchung itself, and in its immediate vicinity. Here, in a total area of less than 25 square miles, the present writer has recorded no less than 1355 different species and varieties of wild plants, fully 85 per cent of which can be found in an area of 5 square miles.[1] Although he has worked in his spare time for the past 9 years on the compilation of a complete list of the wild flora of this region, the writer is nevertheless convinced that the recorded list is still far from complete. If the cryptogams of the region could be as thoroughly collected and as accurately identified as have the phanerogams, the total for even this very small portion of the area under discussion would most certainly mount to well above two thousand species and varieties. Among the botanists who have collected in the region should be mentioned William Henry Leggett, Ezra Brainerd, Frank Tweedy, Nathaniel Lord Britton, Per Axel Rydberg, George Valentine Nash, Kenneth Kent

* A correction should be made in part I of this article, in the May-June number of Torreya: on page 61, beginning on line 10 the sentence should read: "and planed down in the Cretaceous and Tertiary Periods (since late Cretaceous deposits are overlain by Tertiary in southern New Jersey)."

[1] The observed flora of Watchung, N. J., and its immediate vicinity. Ed. 3. The Elsinore Press, Watchung, N. J. 1934. Also supplements.

Mackenzie, Mintin Asbury Chrysler, Waldron de Witt Miller, Percy Wilson, Norman Taylor, Gladys Pomeroy Anderson, and Edward J. Alexander. The collections of Mackenzie, Miller, and Tweedy are probably the most extensive made in the region before the present survey was begun.

In the Watchung area, out of the total of 1355 species and varieties recorded, 1105 (or 81 per cent) are native—the remaining 250 (or 19 per cent) are introduced. Some of these foreign introductions have become very widely naturalized and constitute what may in many cases be designated as pernicious weeds. Others have become only sparingly naturalized; a few have been found only as waifs. Species existing in the area only in cultivation are, of course, not here considered. Of the 250 introductions to the region, 164 are indigenous to Europe, 12 to Eurasia, 26 to Asia, 1 to the Old World tropics in general, 14 to tropical America, and 23 to other portions of North America. In addition, 10 species and varieties usually ascribed to horticultural origin have escaped from cultivation and have become more or less naturalized.

Some of the more interesting naturalized species of the region have been described in a previous article.[2] *Elaeagnus umbellata*, a handsome Japanese shrub with silvery foliage, and *Berberis Thunbergii*, the common barberry hedge, also from Japan, are widespread through the fields, along the streams and throughout the woods on both the First and Second ridges. Their distribution is doubtless explained by the fact that their fruits are fleshy and highly relished by birds. *Azalea japonica* would spread through the open fields far more rapidly even than it has, were it not so relentlessly hunted and uprooted. *Lonicera Morrowi*, *Symphoricarpos albus* var. *laevigatus*, *Monarda didyma*, *Symphytum officinalis*, *Phlox paniculata*, *Convolvulus japonicus* and *C. arvensis*, *Vinca minor*, *Ligustrum obtusifolium*, *Ailanthus altissima*, *Amygdalus persica*, *Malus sylvestris*, *Pyrus communis*, *Chaenomeles lagenaria*, *Spiraea Billiardii* and *S. prunifolia* var. *plena*, *Poterium Sanguisorba*, two varieties of *Deutzia scabra*, *Cleome spinosa*, *Chelidonium majus*, *Pleuropterus cuspidatus*, *Aristolochia macrophylla*, two species of *Narcissus*, *Asparagus officinalis*, *Ornithogalum umbellatum*, and four kinds of *Hemerocallis* are other noteworthy introduced members of the flora.

[2] Torreya **31**: 29–36. 1931.

The European *Sedum triphyllum* is very common, as also are *Allium vineale*, *Salix alba*, *S. fragilis*, and *S. purpurea*, *Humulus Lupulus*, *Broussonetia papyrifera*, *Bilderdykia Convolvulus*, *Ambrina ambrosioides*, *Mollugo verticillata*, *Dianthus Armeria*, *Lychnis alba*, *Silene latifolia*, *Ranunculus acris* and *R. bulbosus*, *Campe verna*, *Sisymbrium Nasturtium-aquaticum*, *Norta altissima*, *Prunus avium*, *Abutilon Theophrasti*, *Pastinaca sativa* var. *sylvestris*, *Lysimachia Nummularia*, both the white- and the yellow-flowered *Verbascum Blattaria*, *V. Thapsus*, and *Lonicera japonica*. Eight European mints are common—*Lamium purpureum*, *Glecoma hederacea*, *Leonurus cardiaca*, *Mentha gentilis*, *M. piperita*, *M. spicata*, *Nepeta Cataria*, and *Prunella vulgaris*. *Leucanthemum vulgare*, from Europe, is one of the most conspicuous summer flowers in open fields and along roadsides, and *Galinsoga ciliata*, from South America, together with *Portulaca oleracea*, from Europe, are among the most persistent and pernicious of garden weeds. Other common introduced composites are *Arctium minus*, *Chamomilla suaveolens*, *Cirsium arvense* and *C. lanceolatum*, *Senecio sylvaticus* and *S. vulgaris*, *Tanacetum vulgare*, *Tussilago Farfara*, blue and white chicory, dandelion, and two forms of *Lactuca virosa*. Of the 8 species of hawkweed, 4 are native and 4 European. *Hieracium murorum* is found in one large colony in the area—one of the half dozen records of this species for America.

Without doubt the rarest and most interesting of all the native plants of the region is *Obolaria virginica*, a saprophytic member of the gentian family, which has been found in sizable colonies in many localities on the Second Watchung. Orchids, too, are well represented. Thus far 17 species, representing 11 genera of this family, have been found in the vicinity of Watchung, including *Blephariglottis grandiflora*, *B. lacera*, *B. psycodes*, *Corallorhiza maculata* and *C. odontorhiza*, *Goodyera repens* var. *ophioides*, *Isotria verticillata*, *Limodorum tuberosum*, *Liparis liliifolia*, *Galeorchis spectabilis*, *Malaxis unifolia*, and *Perularia flava*. Four species of ladies-tresses (*Spiranthes*) are there found, and the moccasin-flower (*Fissipes acaulis*) is rather abundant in some localities. None of these orchids, however, can justly be designated as common and should therefore be afforded all the protection and conservation that it is possible to give them. Other species, common in the region up to a

very few years ago, must now also be afforded protection, such as the cardinal-flower (*Lobelia cardinalis*), the butterfly-weed (*Asclepias tuberosa*), the great blue lobelia (*Lobelia siphilitica*) and the pale spiked lobelia (*L. spicata*), the golden-club (*Orontium aquaticum*), the yellow field lily (*Lilium canadense*) and the wood lily (*L. philadelphicum*), prince's-pine (*Chimaphila umbellata*) and spotted wintergreen (*C. maculata*), pinxter-flower (*Azalea nudiflora*), wild columbine (*Aquilegia canadensis*), trailing arbutus (*Epigaea repens*), fringed gentian (*Anthopogon crinitum*), closed gentian (*Dasystephana Andrewsii*), rose-pink (*Sabbatia angularis*), and Virginia bluebells (*Mertensia virginica*). Four other species, formerly very abundant in the region, are being relentlessly persecuted by unthinking persons who yearly destroy hundreds of the plants and thus year by year bring the species nearer to extermination. These species are the trailing Christmas-green (*Lycopodium flabelliforme*), the bayberry (*Cerothamnus carolinensis*), the climbing bittersweet (*Celastrus scandens*), and the flowering-dogwood (*Benthamidia florida*).

In addition to the *Obolaria* mentioned above, 3 other saprophytic phanerogams occur in the area—*Hypopitys americana*, *Monotropa uniflora*, and *Thalesia uniflora*. The Indian paintbrush (*Castilleja coccinea*) is still to be found in some localities and 3 species of gerardia (*Agalinis*) are fairly abundant. The true American ginseng (*Panax quinquefolium*) still occurs in at least one locality, and another rarity is *Ilex bronxensis*. The American bladdernut (*Staphylea trifolia*) occurs in scattered localities, as does also the redbud (*Cercis canadensis*). All the plants mentioned in this and the preceding paragraph deserve conservation, and, indeed, in many cases urgently need our protection. They are the true "vanishing Americans."

Plainfield was for some time the headquarters of Ezra Brainerd who was fascinated by the wealth of wild violets in the Watchung area. No less than 33 distinct species, varieties, and named hybrids have been recorded from the region, including the rare *Viola Bissellii*, *V. conturbata*, *V. columbiana*, *V. erratica*, *V. Malteana*, *V. modica*, *V. Napae*, and *V. ravida*. The sugar maple (*Acer saccharum*) and the Canada hemlock (*Tsuga americana*) both occur native in Wetumpka Notch and on other portions of the First and Second Watchungs; 11 species of tick-

trefoil (*Desmodium*) have been recorded, and 13 species and 2 hybrids of *Rubus*. *Robinia viscosa* occurs in numerous localities as though native; *Rubacer odoratus* is abundant; and *Crataegus uniflora* quite common. Of the 11 species of willow recorded, at least 5 are native and the rest so widely naturalized as to appear indigenous.

The wide occurrence of the yam-root (*Dioscorea villosa*) in the region comes as rather of a surprise, as does also the abundance of the sweet-gum (*Liquidambar styraciflua*) and of *Achillea asplenifolia*. Other interesting natives are *Celtis crassifolia*, *Asarum reflexum*, *Triosteum aurantiacum* and *T. angustifolium*, *Menispermum canadense*, and *Corydalis flavula*. Nine kinds of *Ranunculus*, 6 of *Rosa*, 5 of *Lespedeza*, 4 of *Xanthoxalis*, 8 of *Asclepias*, 4 of *Cuscuta*, 4 of *Scutellaria*, 5 of *Physalis*, 5 of *Veronica*, 7 of *Galium*, 6 of *Viburnum*, 7 of *Eupatorium*, 5 of *Senecio*, 15 of *Solidago*, and 7 of *Scirpus* occur in the neighborhood of Watchung. The largest genus, however, in this area is *Carex* with 85 recorded species. The lichen *Cladonia* has 32 forms in the area, *Panicum* coming next with 25, and *Aster* taking fourth place with 24. Of ferns and fern-allies there are 32, of grasses 97, of sedges 113, and of composites 132 species and named varieties. Culver's-root (*Veronicastrum virginicum*), milk-purslane (*Chamaesyce maculata*), and two species of yellow false-foxglove (*Aureolaria*) are abundant in many localities, and turtle-head (*Chelone glabra*), monkey-flower (*Mimulus ringens*), and 3 species of forget-me-not (*Myosotis*) may be found in wet places. Ditch-stonecrop (*Penthorum sedoides*), green-milkweed (*Acerates viridiflora*), white baneberry (*Actaea pachypoda*), entchanters'-nightshade (*Circaea latifolia*), and 4 species of loosestrife are abundant. *Azalea prinophylla* occurs sparingly, as do also *Cirsium muticum* and *Pedicularis lanceolata*. Other rarities are *Chamaelirium luteum*, *Melanthium latifolium* and *M. virginicum*, the large-flowered wake-robin (*Trillium grandiflorum*), Indian cucumber-root (*Medeola virginiana*), and carrion-flower (*Nemexia herbacea*). Along watercourses are to be found *Heteranthera reniformis*, *Zosterella dubia*, *Ceratophyllum demersum*, *Utricularia gibba*, lizard's-tail (*Saururus cernuus*), spatterdock (*Nuphar advena*), 2 species of pondweed (*Potamogeton pusillus* and *P. diversifolius*), 2 of bur-reed (*Sparganium androcladum* and *S. eurocarpum*), the common arrowhead (*Sagit-*

taria latifolia), water-plantain (*Alisma subcordatum*), and the ubiquitous *Spirodela polyrhiza* (smallest of all known flowering plants), duckweed (*Lemna*), and cattail (*Typha*). The sweet-flag (*Acorus Calamus*) is very common, and a pinweed (*Lechea Leggettii*) abounds in open woods, while the sticky-flowered *Cuphea petiolata* is widely distributed in dry fields. Two species of yellow false-flax (*Cathartolinum*) and two of partridge-pea (*Chamaecrista*) are common, but the presence of *Plantago halophila*, *Melampyrum lineare*, *Grossularia hirtella*, *Ribes triste*, and *Micranthes pennsylvanica* comes as a surprise. Three species of *Apocynum* often grow almost side by side in Washington Valley, from which locality 84 forms of lichens, 52 species of mosses, 55 agarics, and 13 polypores have also been recorded.

Extremely showy is the tall purple-flowered gayfeather or blazing-star (*Liatris spicata*). Very noteworthy is the presence of the cranberry-bush (*Viburnum trilobum*) and of the purple virgin's bower (*Atragene americana*).

Other plants of the region worthy of mention are the common eastern rush (*Juncus effusus* var. *solutus*), the northern pitcher plant (*Sarracenia purpurea*), the swamp-honeysuckle (*Azalea viscosa*), the round-leaved sundew (*Drosera rotundifolia*), the northern prickly-pear (*Opuntia compressa*), the walking fern (*Camptosorus rhizophyllus*), the northern hornbeam (*Carpinus caroliniana* var. *virginiana*), the common American reed (*Phragmites maximus* var. *Berlandieri*)[5] and the sassafras (*Sassafras albidum* var. *molle*).

In a future article the author hopes to compare the northern (glaciated) with the southern (unglaciated) portions of the Watchung Mountains and the eastern ridges (First and Second) with the western ones (Third and Fourth).

New York, N.Y.

[5] **Phragmites maximus** var. **Berlandieri** (Fourn.) Moldenke, com. nov. *Phragmites Berlandieri* Fourn., Bull. Bot. Soc. France **24**: 178. 1877. In regard to the application of this varietal designation to our American reed, see Fernald, Rhodora **34**: 211 (1932) and in regard to the new specific designation, see E. D. Merrill, Trans. Am. Philos. Soc. New Ser. **24**[2]: 79-80 (1935).

The replicate species of Phlox of the Pacific northwest*

Harold St. John

Certain species of *Phlox* (Polemoniaceae) have the hyaline membranous intercostal portion of the calyx-tube replicate or folded out into conspicuous sacs. Such is the case, for instance, in *Phlox longifolia* Nutt. This species and its relatives form the object of the present study.

The Herbarium of the State College of Washington is rich in material and contains some of the types of this group. Then, too, through the kindness of Dr. Aven Nelson, it has been possible to borrow some of the Elias Nelson types from the Rocky Mountain Herbarium. Dr. B. L. Robinson has likewise aided by lending original specimens from the Gray Herbarium.

The first northwestern replicate species to be described was *Phlox longifolia* Nutt. This was based on plants collected by Capt. Nathaniel J. Wyeth, "In the valleys of the Rocky Mountains generally." The specimens were collected by Wyeth on the return journey of his first expedition to Oregon. They probably came from western Montana, though Wyeth's Journal does not mention them definitely. This Wyeth collection, now in the Gray Herbarium, consists of four branches. Three of them are glabrous or nearly glabrate on the calyces, peduncles, and leaves, and agree with the phrase in the original description, "foliis . . . glabris." The remaining specimen is white puberulent on the calyces, peduncles, and stems. All have filiform leaves 0.5–1 mm. wide. Dr. Asa Gray maintained[1] the species, describing it as "nearly glabrous or pubescent, . . . leaves mostly narrowly linear."

The next member of this group of plants with the replicate calyx was collected by Charles A. Geyer in the "valley of the Kooskooskie River and the adjoining plains," or as it is now known, the lower Clearwater River, Idaho, and the Palouse Country of Idaho and adjacent Washington. It was published by Sir W. J. Hooker as *P. speciosa* Pursh, var. *linearifolia*.[2] A

* Contribution No. 46 from the Department of Botany, State College of Washington.

[1] Syn. Fl. N. Am. 2, pt. 1: 133, 1878.

[2] Journ Bot. Kew Miscell. 3: 289, 1851.

duplicate type specimen of this, *Geyer* 340, from the Gray Herbarium shows a large branch, with linear leaves, 2–2.7 mm. broad, and a white puberulence on the calyx, pedicels, and leaves. Dr. Gray raised this variety to specific rank,[3] describing it in Latin, then eight years later translated his description into English[4] as "Glabrous, above sometimes minutely hirsute-pubescent, . . . leaves very narrowly linear (an inch or two long, about a line wide)."

The next general treatment of these plants was by Elias Nelson in 1899 in his Revision of the Western North American Phloxes. Like Dr. Gray, he maintained the two plants as species, but characterised *P. longifolia* as with leaves 2–3 mm. wide, and *P. linearifolia* with leaves 1–1.5 mm. wide, and allowed both to have the leaves either glabrous or pubescent. He described several other species of the same general affinity.

A later monographic revision was published in 1907 by A. Brand.[5] He maintained *P. longifolia* as an aggregate species, giving it a general inclusive range and description, but not citing any specimens or including any subsp. or var. typica along with the others. He treats as subsp. *linearifolia* (Gray) Brand the plants with leaves 1–2 mm. broad, and either puberulent or glabrous. Since the name started with Hooker, this authority should, of course, be corrected to read subsp. *linearifolia* (Hook.) Brand.

The original descriptions of these two plants are short and somewhat indefinite. The Wyeth type of *P. longifolia* Nutt. included a mixture of three glabrate plants with one puberulent plant. Dr. Gray's treatment allowed both variations of pubescence in both species. So also did Elias Nelson, but he divided the plants primarily on the width of the leaf. The latter student apparently did not see the type specimens of these two, or he could not have called the narrow leaved plant *linearifolia* and the broad leaved one *longifolia*, which is just the reverse of the nature of the original specimens. Brand continued this same error, at least for *linearifolia*. The treatments by the authors of the various current floras so closely follow these monographic treatments that they will not be discussed here in detail.

[3] Proc. Am. Acad. **8**: 255, 1870.
[4] Syn. Fl. N. Am. **2**, pt. 1: 133, 1878.
[5] Pflanzenreich IV, fam. 250: 65, 1907.

A recent revision of this group by Dr. Aven Nelson appeared[6] in 1931. His treatment is not essentially different from that of Elias Nelson, but he keys *P. longifolia* as with "Leaves 3 mm. or more broad, 4–8 cm. long," and *P. linearifolia* as with "Leaves 2 mm. or less broad, 3–6 cm. long."

A prolonged study of this group has made clear that the width of the leaf is a markedly variable character. A large series of specimens shows a gradual progression from ones as narrow as 0.5 mm. to those up to 3 mm. Even if 2 mm. is chosen as an arbitrary division point, it will separate the plants into two piles, but each of these will contain both glabrous and pubescent plants. If the plants are sorted on the pubescence character, particularly that of the calyx, the division into groups is much more clear and convincing. Were other characters correlated, it would be logical to maintain both as species, as did Gray and E. Nelson. However, some collections show intermediate conditions, even in the pubescence of the calyx. One such from Palouse Falls, Washington, St. John & Pickett 6152, contained five branches with the glabrous calyces, five with markedly hispidulous calyces, and one scarcely so. These were growing side by side, were collected as one number, and show a blending of the characters. The pubescence of the leaves is usually similar to that of the calyces, but some specimens recombine these characters. The ranges of the two plants are nearly identical.

There is also a glandular pubescent plant which has to be considered. All in all, the writer is convinced that this group is most truly classified as one species, *Phlox longifolia* Nutt., with several varieties.

Key to Phlox longifolia and its Varieties.

Plant not glandular pubescent,

Calyx glabrous; leaves glabrous or with sparse basal ciliations. *Phlox longifolia.*

Calyx hirsute; leaves usually so, or puberulent. Var. *linearifolia.*

Plant glandular puberulent. Var. *puberula.*

Phlox longifolia Nutt., Journ. Acad. Nat. Sci. Phila. **7**: 41–42, 1834. Perennial, 1–4 dm. tall; tap-root yellowish, elong-

[6] Am. Journ. Bot. 18: 441–442, 1931.

ate, up to 2 mm. in diameter; crown becoming multicipital, stems repeatedly bushy branched, woody, usually glabrous; leaves 1.2–8 cm. long, 0.5–2 mm. wide, linear, acute, glabrous or villous ciliate at base, the midrib heavy; cymes few flowered, loose; pedicles 3–33 mm. long; calyx 7–14 mm. long, the intercostal portions membranous, saccate extruded at base, the lobes subulate, with a strong green rib; corolla deep pink, the tube 12–14 mm. long, slightly broader above, pilose within at base; the lobes 8–16 mm. long, elliptic-oblanceolate, obtuse; anthers 1.5–2 mm. long, elliptic-oblong; style equaling or well exceeding the calyx, shorter than the corolla; capsule 4–5 mm. long, ellipsoid, yellowish, punctate; seeds 2.3 mm. long, ellipsoid, compressed, brown.

Type locality: In the valleys of the Rocky Mountains generally. (Probably western Montana.)

Specimens examined:

British Columbia: Lake Osoyoos, June 1, 1905, *J. M. Macoun* 68712; Dog Lake, April 20, 1906, *J. R. Anderson;* Fairview, April 26, 1906, *J. R. Anderson;* Penticton, July 26, 1918, *W. B. Anderson.*

Washington: Asotin Co., open hillsides, mouth of Grand Ronde, Sect. 19, T. 7 N., R. 47 E., May 9, 1925, *H. St. John* 3517. Adams Co., sandy sage brush soil, Washtucna, May 23, 1903, *J. S. Cotton* 1035. Franklin Co., Pasco, May 25, 1896, *H. H. Hindshaw* 19; Pasco, May 26, 1899, *C. V. Piper* 2959. Lincoln Co., Sprague, May 30, 1892, *L. F. Henderson.* Yakima Co., sand plains, Sunnyside, May 17, 1901, *J. S. Cotton* 500; North Yakima, 1894, *Mrs. W. L. Steinweg;* dry sage brush land, North Yakima, May 25, 1892, *L. F. Henderson* 2415; North Yakima, April 22, 1898, *C. V. Piper;* gravelly sage brush lands, head of Moxee Valley, May 31, 1902, *D. Griffiths & J. S. Cotton* 31 and 32.

Idaho: Nez Perce Co., hillsides, May 1892, *J. H. Sandberg.*

Oregon: Wallowa Co., grassy hillsides, 1500 ft., Yreka Creek, T. 1. S., R. 50 E., May 21, 1927, *C. English & E. Hardin* 925.

Montana: Valleys of the Rocky Mts. generally (Nutt. from *Wyeth*).

P. longifolia Nutt., var. **linearifolia** (Hook.) new comb.; *P. speciosa* Pursh, var. *linearifolia* Hook., Journ. Bot. Kew Miscell. **3**: 289, 1851; *P. linearifolia* (Hook.) Gray, Proc. Am. Acad. **8**: 255, 1870; *P. longifolia* Nutt., subsp. *linearifolia* (Gray) Brand, Helios 22: 80, 1905. Stems glabrous or pilose; leaves 1.2–6.5 cm. long, 0.5–3 mm. wide, glabrous to puberulent or hirsute; calyx hirsute; corolla lobes obtuse or acute.

Type locality: Only in the valley of the Kooskooskie River and the adjoining plains. June (*C. A. Geyer*) n. 340. (Clearwater River valley near Lewison, Idaho).

Specimens examined:

British Columbia: Summerland, April 22, 1906, *J. R. Anderson.*

Washington: Asotin Co., Asotin, April 7, 1908, *R. K. Beattie.* Adams Co., dry soil, Washtucna, May 18, 1903, *J. S. Cotton* 973. Columbia Co., Dayton, May 16, 1921, *Mrs. Jennie A. Reehes.* Franklin Co., gravelly hillside, Kahlotus, May 20, 1903, *J. S. Cotton* 1011. Grant Co., Quincy, April 20, 1912, *A. D. Foster* 6. Lincoln Co., Sprague, June 10, 1918, *W. P. Taylor* 371. Spokane Co., Spokane, May 19, 1899, *C. V. Piper;* Hangman Creek, 1510 ft., May 23, 1893, *J. H. Sandberg & J. B. Leiberg* 62; Spangle, June 24, 1899, *C. V. Piper;* low prairie at Spangle, June 29, 1916, *W. Suksdorf* 8657b; sparse, on dry grassy hillside, Bonnie Lake, May 30, 1923, *H. St. John, F. L. Pickett & F. A. Warren* 3199. Whitman Co., head of Rock Lake, hills, common, May 28–30, 1904, *R. K. Beattie & W. H. Lawrence* 2428; dry rocky hillside, Rock Creek, west of Winona, April 10, 1924, *H. St. John, J. A. Cary, F. L. Pickett & F. A. Warren* 6265; St. Johns, May 21, 1904, *R. K. Beattie* 2317; dry bluffs above Palouse River, Colfax, July 9, 1922, *C. S. Parker* 578; Snake River bluffs, near Lewiston Idaho, April 14, 1900, *Byron Hunter* 31; dry stony hillside, 2 mi. below sp. at fork of road, Wawawai Canyon, May 19, 1922, *C. S. Parker* 366; Wawawai, May 16, 1892, *E. R. Lake* 594; Wawawai, May 18, 1892, *W. R. Hull;* Wawawai, May 13, 1893, *C. V. Piper* 1513; bluffs of Snake River, Wawawai, June 17, 1899, *C. V. Piper* 3009; Wawawai, April 23, 1921, *H. St. John* 9751; Almota, May 27, 1893, *C. V. Piper;* Pataha, July 5, 1892, *W. R. Hull* 594. Walla Walla Co., Waitsburg, April 21, 1897, *R. M. Horner* 159; April 2, 1911, *G. A. Hill.* Yakima Co., in clumps of sage brush, Rattlesnake Mts. May 1901, *J. S. Cotton* 348.

Idaho: "Oregon," valley of the Kooskooskie, *Geyer* 340. Bear Lake Co., abundant on the hills and flats, Montpelier, May 15, 1910, *J. F. Macbride* 12.

P. longifolia Nutt., var. *puberula* E. Nels., Rev. W. N. Am. Phloxes, Ninth Rept. Wyo. Agr. Coll. 26, 1899 *P. puberula* (E. Nels.) A. Nels., in Coult. & Nels., New Man. Bot. Centl. Rocky Mts. 397, 1909; *P. viridis* E. Nels. l.c. 24, 1899.

Plant glandular puberulent at least above; pedicels 2–45 mm. long; corolla lobes obtuse, acute, or emarginate.

Type locality: Evanston, Wyo., June 5, 1898, *Aven Nelson* 4544.

Specimens examined:

Washington: Wenatchee, April 12, 1900, *K. Whited;* Wenatchee, April 24, 1900, *K. Whited;* Wenatchee, *K. Whited* 9; Wenatchee, May 28, 1896, *K. Whited* 39; Wenatchee, May 2, 1898, *K. Whited* 628; Wenatchee, May 25, 1899, *K. Whited* 1037; Wenatchee Flat, April 12, 1900, *K. Whited;* Wenatchee Flat, April 15, 1900, *K. Whited;* near Malaga, May 21, 1899, *K. Whited* 1037. Douglas Co., scab lands, Waterville, April 22, 1900, *K. Whited* 1212; Badger Mts., April 24, 1900, *K. Whited* 1212. Klickitat Co., dry hillsides near Columbus, April 23, 1909, *W. Suksdorf* 6508. Yakima Co., bunch grass lands, between

Wenas and Umtahnum Creeks, June 5, 1903, *J. S. Cotton* 1152; Ellensburg, June 5, 1897, *K. Whited;* Naches, May 10, 1923, *E. Nelson* 1451.

Idaho: Ada Co., open inclines, alt. 2880 ft., May 6, 1911, *J. A. Clark* 4. Canyon Co., bench lands, volcanic ash, alt. 220 ft., Falks Store, April 22, 1911, *J. F. Macbride* 761.

Oregon: sterile ridges of the S. Blue Mts., 4–5000 ft. alt., generally distributed, June 1897, *W. C. Cusick* 1646.

Wyoming: Uinta Co., Evanston, June 5, 1898, *Aven Nelson* 4544.

University of Hawaii,
Honolulu, Hawaiian Islands.

FIELD TRIPS OF THE CLUB

Trip of April 12—Easter Sunday—To Branchville, Conn.

Easter Sunday was not the warm, sunny day that people usually look forward to; instead the day was cold, damp and overcast. However Torrey members are hardy and a group appeared. Because it had rained almost every day the preceding week the mosses and lichens were in excellent condition. *Bartramia pomiformis* was discovered for the first time in the region in many isolated patches and *Buxbaumia aphylla* was really almost common. It was gratifying to note the interest aroused in these tiny plants as everyone eventually knelt down to examine a fruiting body with a hand lens. One magnificent fruiting patch of *Baeomyces roseus* was seen in the morning.

It is always a delight these days to find virgin forest. The hemlock forest of the morning trail is one of rare beauty. The stand of *Cypripedium acaule* was just making its appearance above the ground in the center of the hemlock forest. However, everyone could imagine what a magnificent sight so many orchids in bloom would make.

Plants were easily identified but few were in bloom. Hepatica, Trillium, Early Saxifrage, Antennaria, and Golden Saxifrage were the only herbaceous plants in flower.

Recognition of plants by taste proved to be an interesting topic. Those who had never tasted partridge berry, wintergreen, black birch, water cress, toothwort, and dwarf ginseng partook of the opportunity.

We digressed from our botanical studies for a short time in the afternoon to become amateur herpetologists. The leader brought some spotted salamander eggs from out a pond in the woods and discussed the two types of masses laid by one species. Wood frog tadpoles and water newts were also seen.

Yellow Birch and Beech were dominating species of the forest trail taken in the afternoon—both attaining to unusual sizes. An Alternate-leaved Dogwood was the rarest tree observed.

Dr. Sharp, director of Life's Camps peped us up for our long afternoon trek by making a large fire in the Recreation Hall fireplace of Life's Girls' Camp and preparing a huge pot of coffee.

Eleanor Friend

Trip of April 25 to the Local Flora Section of the Brooklyn Botanic Garden

About 25 members and guests of the club came to the Brooklyn Botanic Garden to visit the Local Flora Section, now about 5 years old. As Dr. Svenson was away on a collecting trip in the South, the group was met by a substitute leader.

In spite of the cold weather which delayed the flowering of many plants, about 50 species were seen in bloom, all in their characteristic habitats prepared for them in the Garden.

In a shallow sandy pond the bare spikes of *Orontium aquaticum* stood up; and around the border of this pond *Myrica carolinensis* and *Myrica asplenifolia* were showing staminate catkins. In a typical sand barren the flowers of *Corema Conradii* were still out, and those of *Viola pedata* var. *linearilobа* were just beginning to open.

Kalmia polifolia was in bud in the bog; and in the moist area around its borders *Chamaedaphne calyculata*, *Helonias bullata*, and *Myrica Gale* (staminate) were still in flower, and *Rhododendron canadense* almost ready to burst into bloom. In a sandy area near the bog *Leiophyllum buxifolium* was full of tiny buds and *Pyxidanthera barbulata* in full bloom. A little patch of *Epigaea repens* was blooming in dry sand; and in the shelter of a rock wall on the southwest was *Viola rotundifolia*. *Saxifraga virginiensis* was the only plant in bloom on the serpentine slope.

Along the brook were flowers of *Coptis trifolia*, *Viola affinis*, and *Mertensia virginica*, as well as old flowers of *Symplocarpus foetidus;* and in the meadow at the outlet of the brook *Caltha palustris* and *Trollius laxus* were blooming and fruiting both at once.

The rich woodland section was full of spring flowers, some of the most interesting of which were *Trillium grandiflorum* and *Trillium erectum*, *Uvularia grandiflora* (buds), *Asarum canadense*, *Caulophyllum thalictroides*, *Jeffersonia diphylla*, *Podophyllum peltatum* (in bud), *Sanguinaria canadensis*, *Mitella diphylla*, and half a dozen species of violets.

The more open wooded slope was almost a solid mass of *Viola latiuscula*, with a few other species intermingled, such as *Claytonia caroliniana* and *Claytonia virginica*, *Hepatica acutiloba*, *Ranunculus fascicularis*, *Ranunculus hispidus*, and *Aquilegia canadensis*.

Hester W. Rusk

Mohonk Week-End Trip—May 1 to 3

The week-end spent at Lake Mohonk by 20 members and friends of the club was delightful beyond description. The high mountains, lichen-covered rocks, and broad vistas were exhilarating and demanding to those interested in botany, ornithology and herpetology.

Mr. Smiley, who was an excellent host and leader thruout the week-end, led an all-day trip on Saturday. Among herbaceous plants seen in flower were *Houstonia caerulea*, *Anemonella thalictroides*, *Anemone quinquefolia*, *Viola conspersa*, *V. cucullata*, *V. sororia*, *V. pallens*, *V. rotundifolia*, *V. pubescens*, *Coptis trifolia*, *Medeola virginiana* and *Asarum canadense*. *Amelanchier canadensis* was at the height of its bloom while *Acer pennsylvanicum*, *A. spicatum*, *Kalmia latifolia* and *Tsuga canadensis* were prevalent. Most of our native trees were represented, some in unusually attractive stands.

The rarest of ferns seen was a small clump of *Camptosaurus rhizophyllus*. *Aspeenium ebenoides* was quite common in particular areas altho it was not growing on or near limestone. *Bartramia pomiformis* was abundant on the west slope of one of the hills.

Birds quite naturally claimed our attention at intervals, for the unspoiled hemlock and deciduous tree associations are havens for birds. Mr. Smiley listed the following species during course of day: Black and White Warbler, Turkey Vulture, Towhee, Crow, Ruffed Grouse, Junco, Red-Tailed Hawk, Chickadee, Ovenbird, Blackthroated Green Warbler, Myrtle Warbler, Hairy Woodpecker, Wood Thrush, Phoebe and Blue-headed Vireo.

A party of three including our host went on a herpetological trip after dark. As we neared our destination a chorus of frog voices mingled with whip-poor-wills greeted us. Pickeral frogs which were most numerous were singing above and under water and their egg masses were numerous. Upon examination of masses it was seen that they were in all stages of development. Green frogs, bull frogs and spring peepers were also observed and a few taken to exhibit in the School Nature League Room at the American Museum of Natural History. Three water snakes and numerous painted turtles were seen in the pond. A

spring and its stream were investigated for red salamanders but only very large dusky salamanders were found.

After being rewarded for getting up in the wee small hours and hiking up to sky-top by seeing the sun rise between showers, a few of us went "birding." More birds were heard than seen due to dense foliage. Those recorded were: Robin, Chipping Sparrow, Towhee, Flicker, Ovenbird, Black and White Warbler, Chicadee, Black-throated Blue Warbler, Junco, Hawk (Buteo sp.), White-throated Sparrow, Winter Wren, Blue Jay, Blue-headed Vireo.

A few of us who were not to be phazed by a little rain spent Sunday morning exploring on wooded hills and in a swamp. Mosses and lichens were in excellent condition due to the rain. *Umbilicaria Muhlenbergii* was seen growing with *U. pustulata*, *U. Dillenii*, and *U. pennsylvanica*. A lichen expert would have been an asset to the party.

Trillium undulatum in flower and a sturdy stand of *Clintonia borealis* were revealed to us and afforded us more pleasure than any other specimens seen during the week-end. *Caltha palustris*, *Panax trifolium*, *Trillium erectum*, *Dentaria diphylla* and many others were seen in flower. A splendid stand of *Viburnum alnifolium* in flower was seen growing with *Kalmia latifolia* along the edge of the swamp.

Eleanor Friend

Field Trip of May 3

In alternate sunshine and thunder showers, ten members and guests of the Club explored the ledges and valley of Inwood Park, Manhattan, on Sunday afternoon, May 3. Sixty-three species of woody plants were seen, of which twenty-five were in bloom. Of these, the most conspicuous was the cloud of fragile white flowers of the shadbush (*Amelanchier canadensis*), and the most interesting were the greenish flowers of the hackberry (*Celtis occidentalis*), with their curious horn-like stigmas, long-pointed and recurved.

The fine stands of oaks on the hillsides, and the tall tulip trees in the Glen appear to be but slightly affected by the extensive draining, grading, and road-building operations which are still in progress. But the delicate herbaceous plants in Shor-a-kapkok Glen are fast retreating before the advance of the steam

shovel. Despite the "improvements," however, the Dutchman's breeches (*Dicentra Cucullaria*) seems to be holding its ground, for a number of fruiting plants were found, as well as a few belated flowers. The robust jack-in-the-pulpit, too (*Arisaema triphyllum*), is determined, apparently, to survive. Several patches of toothwort (*Dentaria laciniata*) were in bloom, and one plant of *D. diphylla*. The blue cohosh (*Caulophyllum thalictroides*) was in flower, but very few specimens were seen.

The famous old giant tulip tree near the spring, now in the last stages of decrepitude, still stands at the edge of Spuyten Duyvil. But only the glacial pot-holes at the head of the Glen, together with the Indian caves in the shelter of Cock Hill cliff, remain unchanged by the swirl of progress around them.

HILDA VILKOMERSON

FIELD TRIP OF MAY 17 TO MR. LEWIS' ESTATE

Eleven members of the club enjoyed the trip on Sunday, May 17, to "Skylands," the estate of Mr. Clarence McK. Lewis, at Sterlington, N.Y. With Mr. Longmuir, the head gardener, as guide, the party walked through the gardens. An extensive wild garden where Japanese primroses and species of American plants are naturalized was particularly charming. Of much interest was a plantation of *Meconopsis Baileyi*, of perhaps fifty or sixty robust plants, with a number about to bloom. Had the trip been a week later, a long border of Oriental poppies in full bloom would have made a grand display.

After lunch the group, again with Mr. Longmuir as guide, climbed the mountain that overshadows the gardens and took pleasure in the view from the summit, including the Wanaque Reservoir.

It is hoped that the club may enjoy a trip to "Skylands" another year. The estate bears testimony to Mr. Lewis' great interest in horticulture.

J. HARRY LOGAN

FIELD TRIP OF MAY 24 TO NEW HAVEN

Members of the club particularly interested in lichens visited New Haven and vicinity on Sunday, May 24, as the guests of Dr. Alexander W. Evans, of Yale University. The forenoon was

devoted to examination of Dr. Evans' large and growing collection of *Cladoniae*, in the Osborn Botanical Laboratory, at Prospect and Sachem Streets. It is now one of the largest and most representative herbaria of American species, with many foreign ones as well. A considerable number of the packets bore the names of members of the Torrey Botanical Club, who have sent specimens of *Cladoniae* to Dr. Evans for determination, including Mrs. Gladys P. Anderson, George F. Dillman, John Thomson and others.

In the afternoon, the party motored to Bethany, ten miles north of New Haven, under the guidance of Dr. Evans and Dr. Nichols. There a swamp, containing much *Chamaecyparis thyoides*, with a quaking bog in the center which is one of Dr. Evans' favorite collecting spots, was visited. A Cladonia new to this writer, which is common here, around the roots of *Chamaedaphne calyculata*, was *C. glauca*, not yet reported from southern New York or New Jersey, but which should be looked for in similar boggy situations, in our range. *C. rangiferina*, *mitis* and *tenuis* were frequent in spots above the water level. Drosera and Sarracenia occurred in the open bog, and *Calla palustis* in the wet woods bordering it.

Raymond H. Torrey

Branchville Nature Outing, May 22 to 24

About seventy members and guests of the Torrey Club gathered at The Pines, Branchville, N.J., for the eleventh annual nature outing. On other years the members were greeted on arrival by Mr. Stephen Smith, proprietor of the inn and a member of the club. It was he who had kept the surroundings in their natural beauty and encouraged the growth of native wild flowers in the woods. His recent death cast a shadow over the gathering, though Mrs. Smith carried on so well that nothing was left undone for the comfort of those attending the outing. On Friday evening Dr. Henry Kummel, Director of the New Jersey State Department of Conservation, gave a talk on the geology of Northern New Jersey, illustrating the talk by the aid of a large geological map. Dr. Kummel also distributed mimeographed sheets describing the geological formations to be seen on the trips of the following days. Mr. Oliver P. Medsger

entertained the group with a talk on Nature Poetry, quoting a wide variety of poems, ancient and modern. Saturday morning Mr. and Mrs. S. Harmsted Chubb led an early morning bird trip. Another bird trip was taken later, after breakfast, and still another on Sunday morning early. The birds seen were in general the same ones observed at Branchville in other years. The semi-palmated plovers by the pond below the Inn were new to the region as far as observations by the party went. Other trips were led by Dr. Benedict for ferns, with the discovery of several hybrids of the crested shield fern; by Dr. Svenson for the study of flowering plants; by Mr. Medsger for nature study and by Professor Green for the study of trees. Another program on Saturday evening featured a talk on ferns by Dr. Benedict, illustrated with growing plants brought from the Brooklyn Botanic Garden, and a talk on Wild Animals I have Known by Prof. Green describing especially Radio Kelly, the rattlesnake, Tiny and Punsxy the baby bears, and the raven that became a college pest as well as a pet.

Though the region has been visited so many times by the club new things are noted every year. Many members were thrilled by the considerable number of adder's tongue fern, *Ophioglossum vulgatum*, found in the wet meadow below the Inn. *Smilax hispida* with its bristly black stems and a meadow rue, *Thalictrum revolutum*, different from the best-known ones, were other plants new to many of the party.

George T. Hastings

PROCEEDINGS OF THE CLUB

Meeting of March 18, 1936

The meeting was called to order at 3:30 P.M. at the New York Botanical Garden with Vice-President H. A. Gleason presiding. Forty-six members were present. The minutes of the meetings of February 19 and March 3 were read and adopted. The resignation of Mr. George Buckland was accepted with regret. The following members were unanimously elected: Prof. Carl D. La Rue, Department of Botany, University of Michigan, Ann Arbor, Mich.; Mr. C. E. Foweraker, Canterbury College, University of New Zealand, Christchurch, New Zealand; Mr. Arthur Dauman, 96–27 136th Ave., Ozone Park, N.Y.; Miss Rhona E. Lawrence, 511 Juniper St., Quakertown, Pa.; Mr. Frederick Adams, 165 Harrison Place, West Brighton, Staten Island, N.Y.

In reply to the invitation of the Botanical Society of Edinburgh to send a representative of the Club to its centennary celebration on July 1, 1936, Professor T. E. Hazen, of Barnard College, Columbia University, was elected as the delegate.

The secretary was requested to express the views of the Club in opposition to a bill now pending before the House of Representatives in Washington which would permit entry upon, use, and appropriation for mining purposes of the lands in the Glacier Bay National Monument in Alaska.

A motion was presented and passed instructing the treasurer and editor to prepare for insertion a notice in the publications of the Club that missing numbers lost in the mail will be supplied if the Club is notified within a reasonable period of time after date of issue. Thereafter numbers will be furnished at the rate of single numbers as long as they are available.

The scientific part of the program consisted of an illustrated lecture by Mr. C. E. Foweraker of Canterbury College, Christchurch, New Zealand, on "Plant Associations in New Zealand." This address was beautifully illustrated and presented very interesting and stimulating descriptions of the various types of plants to be found in the diverse environmental conditions of that island.

The meeting was adjourned at 5:00 P.M.

Meeting of April 7, 1936

The meeting was called to order at 8:25 P.M. at the Museum of Natural History by Vice-President F. E. Denny, with 62 members present. Miss Laura W. Abbot, R. F. D. #1, Bristol, Pa., was unanimously elected to field membership.

The scientific program consisted of an address by Dr. William Crocker, Director of the Boyce Thompson Institute for Plant Research, on "Time Lapse Motion Pictures of Plant Movements," which was illustrated by two motion picture films. This address stimulated an unusual amount of discussion, particularly in relation to ethylene as an anesthetic and as a means of hastening the ripening or coloring of fruits.

The meeting adjourned at 9:30 P.M.

NEWS NOTES

The degree of Doctor of Science was conferred on Ira N. Gabrielson, Chief of the United States Biological Survey, at the commencement exercises of Oregon State College on June 1. The following tribute was read by Dr. W. J. Kerr, chancellor emeritus and former president of the college: "Ira Noel Gabrielson—Biologist; naturalist; authority on alpine plants; for 20 years a trusted representative of the U. S. Department of Agriculture in charge of rodent control in Oregon; executive of large resources and scientist of wide recognition, long cherished as one of Oregon's leading citizens, and recently honored by being advanced to the high post of chief of the U. S. Bureau of Biological Survey."

THE TORREY BOTANICAL CLUB

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Of former volumes, 24–62 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

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Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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THE TORREY BOTANICAL CLUB
BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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Pollen in Hayfever
Part 2

R. P. Wodehouse

If one wishes to discover which kinds of pollen are abundant in the air and likely to cause hayfever it is only necessary to expose a microscope slide with a small spot lightly coated with glycerine jelly to which has been added an appropriate dye such as basic fuchsin. After exposing for about 24 hours the slide is brought in, warmed gently and covered with a thin cover glass. Examination with the microscope will then show the pollen deeply stained, fully expanded, and properly imbedded in an excellent medium for their identification. If the microscope has a mechanical stage it is a simple matter to count all the different kinds of pollen encountered and so determine the relative abundance of each in the air.

For purposes of identification one should have a reference collection of the pollen of all the different kinds of anemophilous species of the region and as many as possible of the more abundant entomophilous species. Most of these have been described, illustrated, and keyed out in the author's book, "Pollen Grains,"[1] but there is no substitute for a good reference collection. The specimens should be mounted in glycerine jelly and stained with the same dye that is used for making the atmospheric pollen slides.

On atmospheric pollen slides grains of both entomophilous and anemophilous species will be found but the latter always greatly outnumber the former. The anemophilous species are naturally of the greater interest from a hayfever standpoint, but to the pollen morphologist they are distinctly less interesting because they are generally characterized by extreme sim-

[1] Pollen Grains. The McGraw-Hill Book Co. New York. 1935.

OCT 16 1936

plicity. Like wind pollinated flowers they have suffered reductions in response to anemophily. The grains of the grasses which are all anemophilous are smooth and globular, ellipsoidal, or ovoidal. Those of all species are very much alike, differing mainly in size. They may always be recognized by their thin outer coat and single small germ pore slightly raised and provided with a small operculum. The grains of English plantain are somewhat similar but are provided with 7 to 14 pores and their outer coat is slightly mottled. The grains of Rugel's plantain are sometimes caught on pollen slides too, but may easily be distinguished by their rougher coat and fewer pores, 6 to 10 in Rugel's and 4 to 6 in common plantain. The pollen grains of birch are likewise smooth, generally provided with three pores arranged around the equator, each elevated above the surface so as to give the grain a triangular outline. The pollen grains of all the birch family are like this. These grains, though simple, are not primitive; they have achieved this simplicity by evolving away from the central basic forms of angiospermous pollen grains. In reverting to the primitive gymnospermous habit of anemophily they tend to assume in some respects the gymnospermous simplicity of form, yet they can nearly always be distinguished from them. We are reminded in this of the whales and porpoises; upon returning to their remotely ancestral aquatic habit they assumed in part the outward form of their fishy ancestors but retained all the more important anatomical features of their less remote mammalian ancestors.

The goldenrod pollen grain may be taken as an example of the basic form of those of the higher dicotyledons. It is a small globular body about 23μ in diameter with a thin elastic but unperforated inner coat and a thick semi-rigid outer coat, quite appropriately likened to the inner tube and outer casing of an automobile tire, and, like the latter, the outer coat of the pollen grains of different plants exhibit an enormous variety of sculpturing, which is extremely convenient in enabling one to tell which plant was responsible for their genesis. In the golden rod pollen grain the outer coat is covered with short but sharp-pointed conical spines. Since these grains are designed to be carried by insects it might be assumed that these are "non-skid" spines, so to speak, which help to keep the grains from slipping off the insects. This may be partly their function, but under the

microscope they are seen to serve also the purpose of keeping properly distributed a relatively very thick layer of viscous semi-fluid oil with which these grains are provided. This is a matter of minute contours in relation to surface tension and finds its analogy in the fact that you must roughen with sandpaper a newly varnished surface before applying the second coat, or the new coat, while still fluid, will gather into droplets instead of remaining smooth and even. It is this enveloping layer of oil which serves to stick the grains to each other and to the insects which are to carry them; pollen grains lack the weight to make their spines or other sculpturing effective in preventing skidding.

Pollen grains are nearly always very susceptible to changes in moisture. So rapidly do they absorb moisture from their surroundings that it is difficult to accurately weigh a gram or two of most pollen in ordinary air. As the grains take up moisture they expand consequently they must be provided with some mechanism for accommodating such volume changes without prematurely rupturing the non-distensible outer coat. In the goldenrod pollen grain volume changes are accommodated by three meridionally arranged furrows. When such a grain is dry it is ellipsoidal in form with three deep longitudinal grooves, the delicate inner coat completely covered by the protective outer coat. This is the resting condition of the pollen grain. But as soon as it is quickened by the touch of a little moisture the furrows open, very much as the eye opens after sleep, and each furrow is seen to be crossed by a delicate membrane like the cornea of the eye, and in place of the pupil is a central opening, the germ pore, through which may protrude the germinal papilla, accounting for still further internal expansion of the grain. As the furrows expand the grain changes its shape from elongate ellipsoid to spheroid thereby greatly increasing its volume without materially affecting its linear dimensions.

The three-furrowed type of grain is by far the commonest among the higher dicotyledons, accounting for about two-thirds of all species, and may be regarded as the basic form from which all others are derived. The sculpturing varies with the genus, tribe or family. In most of the tribes of the composite family it is echinate like the goldenrod grain, but in the chicory tribe the surface is thrown into an elaborate system of ridges with the spines on their crests, as in the grains of dandelion. In the

olive family the surface is covered with a beatuiful reticulate pattern, as in the grains of privet. In the holly the surface is pebbled. All possible modifications and combinations of these and many other sculpturings are found in association with the basic three-furrowed form of grain.

But not all dicotyledonous pollen grains have only three furrows. Some have 4, 6, 9, 12, 15 up to 30, and even sometimes more. As a rule these conform in arrangement to very definite geometrical patterns. For example, dahlia pollen grains always have six furrows arranged according to the edges of a tetrahedron. Those of the carpet weed (*Mollugo verticillata*) have twelve furrows arranged according to the edges of a cube, and the beautiful grains of the garden portulaca often have thirty furrows arranged according to the edges of a pentagonal dodecahedron. But this is a most exceptional kind of grain because as the number of furrows increases they must shorten, and this they do without losing much in width, thus becoming circular and coinciding in extent with their enclosed germ pores. There are whole families with pollen grains of this kind, provided with round holes instead of furrows, the plantains, the mallows, the four-o'clocks, most of the cucurbits, the amaranths, the chenopods, and many others. These we call pored grains in order to distinguish them from furrowed grains. These pores, of course, cannot function as furrows in accommodating changes in volume but the germinal papillae can be protruded and withdrawn, and in this way they accomplish the same end, making up in numbers their loss of mechanical action. Still other pollen grains have only one furrow, but these are not found among the higher dicotyledons; the one-furrowed grain is the sign of the gymnosperms, the lower dicotyledons, and most monocotyledons, all, in fact, except such Helobieae as the arrow-heads and water plantains which appear to be badly misplaced in our plant classifications for they show their strongest affinities with the crowfoot family among the dicotyledons. Thus the grains of such gymnosperms as the cycads and ginkgo are long and boat shaped with one long furrow reaching from end to end. Those of the dicotyledonous magnolias and peppers are almost exactly the same, so also are those of the lilies and some of the arums among the monocotyledons. The one-furrowed type of grain is immensely ancient, even older than the pollen grain itself, tracing

its origin back to the Pteridosperms, and is even dimly foreshadowed in the spores of the ferns. The three-furrowed grain and its many-furrowed and many-pored derivatives are by comparison quite modern, appearing nowhere below the higher dicotyledons.

Pollen grains, like the plants themselves, are greatly modified by adaptation to their environment, but their environment is very much simpler than that of the plants. In fact all their environmental factors resolve themselves into just one, their mode of pollination. So, while grains which are decorated with spines and ridges and covered with a layer of sticky oil may be just right to be carried off by insects, they would never do if they are to be carried by wind. Such must freely separate from each other and must not stick to anything until they reach the stigma which is designed to catch them. And so it is that anemophilous grains must abandon their golden yellow layer of sticky oil and their beautiful sculptured patterns.

So far is this simplification carried that it is often difficult to even guess from their pollen grains to what entomophilous group of plants an anemophilous plant is related. For example the pollen grains of willows which are primarily insect pollinated have a rather thick outer coat bearing a beautiful reticulate pattern and covered with a thin layer of sticky oil, and are provided with the customary three furrows. The pollen grains of the poplars, on the other hand, which everybody agrees are closely related to the willows but which are entirely wind pollinated, are almost perfectly smooth, with no oil, with an extremely thin—almost fragmentary—outer coat, and no trace of furrows. Another example is found in the tansies and sage brushes. These two genera are very closely related. In fact the sage brushes may be regarded as a group of wind pollinated derivatives of the insect pollinated tansies. The pollen grains of the tansies are provided with a thick spine-covered outer coat like those of most Compositae and covered with sticky oil, while those of the sage brushes have a much thinner outer coat, scarcely any oil and with only occasionally the merest traces of spines. Still another example is found in the ragweed pollen grains. They are characterized by a rather thick exine which is provided with short conical spines and covered with a thin layer of oil and have three small slit-like furrows. One would naturally

conclude from appearances that such a grain must be entomophilous. It does have some entomophilous characters, but, if compared with the pollen grains of their truly entomophilous relatives, these characters are seen to be very much suppressed. For example the pollen grain of the related sunflower has a much thicker exine which is provided with long stiletto-like spines, covered with an abundant layer of oil and provided with three broad and freely functional furrows. The spines and oil of the ragweed grains must be regarded as only vestiges, harping back to their entomophilous ancestors. In the pollen of the closely related cocklebur which appears to be older in anemophily these characters are more completely suppressed; the grains are almost smooth, with only a trace of oil and with furrows reduced to small pits which could be of no possible use in adjusting the grain to changes in volume. Such a function is rendered unnecessary by the thinness of the exine.

Such, then, is the result of anemophily. In most anemophilous plants both the reduction of their pollen grains and the simplification of their floral structures have been carried so far that we have scarcely any clue to their relationships. The grass family affords an example of this. Their pollen grains present a single pore, showing that these plants probably belong to the basic monocotyledonous stock but further than this their pollen grains tell us nothing. Other examples are the birch family, the walnut family and others of the wind-pollinated Amentiferae. Their pollen grains tell us that they belong to the basic dicotyle-

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EXPLANATION OF PLATE II

Beginning at the top and following down to the bottom the grains are named and their diameters given in microns.

Top, left—Ginkgo, *Ginko biloba* L., 28.5 long, ventral view.

Top, center—Pepper, *Piper nigrum* L., 13 long, ventral view, above dry, below moist.

Top, right—Willow, *Solix purpurea* L., 20.5, polar view.

Second, left—Poplar, *Populus tremuloides* Michx., 28.5.

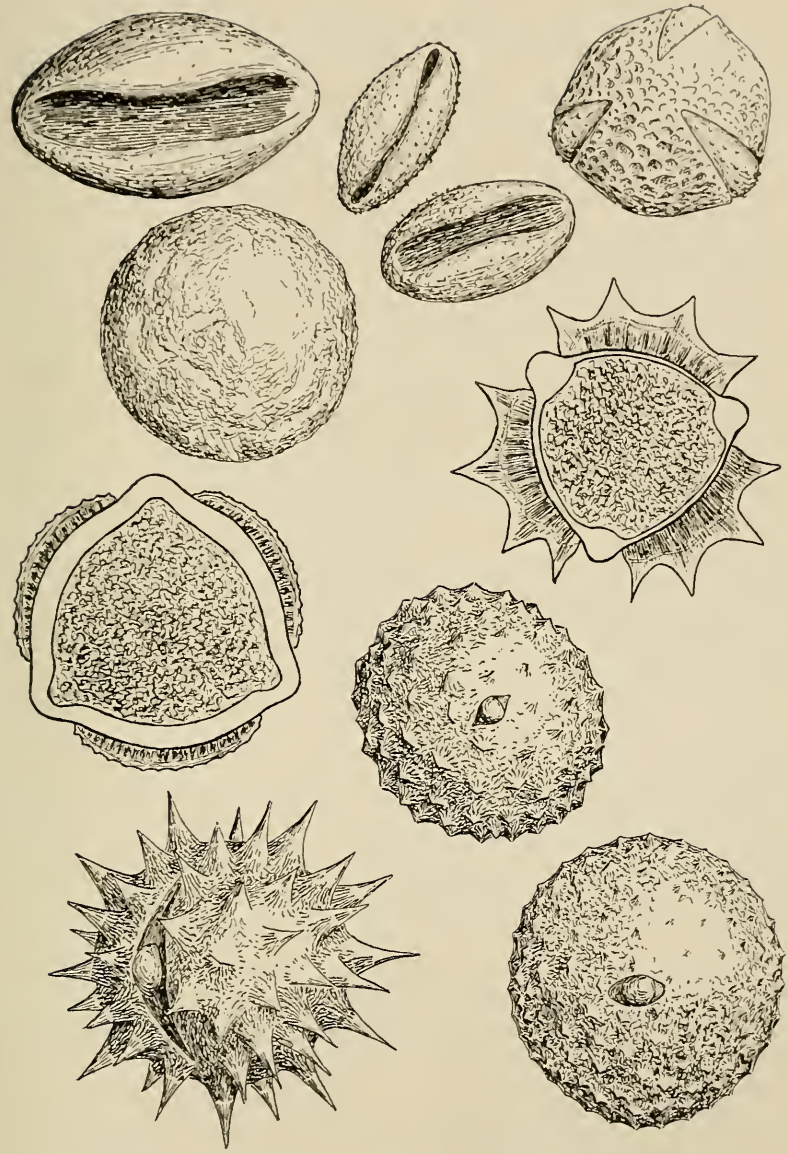
Second, right—Tansy, *Tanacetum vulgare* L., 26, polar view, optical section.

Third, left—Mugwort, *Artemesia vulgaris* L., 28. 5, polar view, optical section.

Third, right—Ragweed, *Ambrosia elatior* L., 17, side view

Bottom, left—Sunflower, *Helianthus annuus* L., 29, side view.

Bottom, right—Cocklebur, *Xanthium canadense* Mill., 27, side view.



WODEHOUSE: POLLEN Plate II

donous stock but nothing more. They are, however, enough different from each other so that we generally may easily recognize the family, often the genus and occasionally even the species of anemophilous pollen which is caught on atmospheric pollen slides. And this is always a great help to the student of hayfever.

Just which of the various kinds of pollen found in the air affect a hayfever patient may be determined by what is known to physicians as the skin test. The theory of the skin test is based on the fact that if a person is sensitive to any particular kind of pollen or other substance in such a way as to cause nasal or other respiratory symptoms the same sensitization extends to all parts of the body, so the customary way of performing the skin test is to make the tiniest possible nicks in the skin and apply to them drops of solutions extracted from the different kinds of pollen to be tested. When the right extract is applied the harmless-looking nick in the skin will immediately take on all the characteristics of a good lusty mosquito bite, including the swelling, itching and surrounding reddish irritation. The test belongs to that class of physiological reactions known as anaphylaxis which includes such phenomena as serum sickness and anaphylactic shock, and is characterized by an explosive violence out of all proportion to the quantity of the irritating material applied. For this reason the test should never be attemped except by the trained practitioner with standardized materials.

After the kinds of pollen in the air have been determined and which of these affect the patient, he has the choice of going elsewhere when the offensive pollens appear, or else of developing his tolerance beforehand. This is accomplished by administering a series of small but gradually increasing doses of extracts prepared from the pollens to which he is susceptible and likely to be exposed. In this the dosage must be carefully controlled. Too little is useless but too much is dangerous, so this also should be attempted only by a skilled physician.

Yonkers, N. Y.

Studies of the Monroe Collection of Asters

Hermann C. Benke

One of the outstanding collections in the Department of Botany of the Public Museum at Milwaukee is that of the genus Aster of the late Charles E. Monroe,[1] a distinguished attorney of that city.

For many years Mr. Monroe was particularly interested in this genus using all the time possible from his profession to make a wide collection and study of it, both in the field and in herbaria. His collections cover an extended territory of eastern Wisconsin, besides gifts and exchanges from other collectors; among them Dr. H. V. Ogden, Dr. A. B. Stout, and the Messrs. Sam. C. Wadmond, Howland Russel, Wm. Finger, Wm. V. Wright, and the writer. In addition, he made a number of collecting and study trips into Illinois and eastward into Ohio, Connecticut and Massachusetts.

In September, 1913, a pamphlet was published by Mr. Monroe as a Bulletin of the Wisconsin Natural History Society, devoted mostly to his findings in Wisconsin asters, but also treating the work done by former workers on the genus in the state from the earliest records, 1838, to the date of his publication.

Mr. Monroe's herbarium specimens are models of neatness and precision—numbered and arranged by species and their variations in leaf-form, coloration, pubescence and other characters. This arrangement, together with its extensiveness, care-

[1] Through the courtesy of Albert M. Fuller, Curator of Botany at Milwaukee Public Museum, and H. W. Cargill of Oberlin College, a few lines of biography can be given:

Charles E. Monroe was born March 28, 1857, at Oberlin, Ohio and died there May 12, 1931, at the age of 74. He was a graduate of Oberlin College and of the Law School of the University of Michigan. In 1924, he was married to Marie Jussen, a niece of Carl Schurz—soldier, statesman, journalist.

Mr. Monroe collected most of the asters himself, but his sister, M. K. Monroe, who passed away in 1917, did some collecting, particularly of violets, and his wife collected quite a number of the asters of the eastern states.

"In the museum herbarium we have 5,341 catalog numbers, consisting of 17,975 sheets. The bulk of his collection which he gave to us in 1924 we have kept intact as a collection. We must have at least 5,000 miscellaneous numbers which he gave to us before 1924, which are in our general herbarium."—Fuller.

ful and conservative determinations and copious notes gives to the collection its special value, hence the Department of Botany of the Milwaukee Museum is keeping it together. Workers may thus note how a species will, in cases, gradually approach extreme characters that quite blend into an extreme of a related species.

Mr. Monroe's collection of the Biotian asters is thoroughly representative, and the macrophyllus group is arranged in a series from delicate, thin-leaved, narrow-bracted specimens to those of heavy, vigorous form with large bracts, spreading in some cases, and long rays. Since Prof. Edw. S. Burgess' exhaustive studies in this group were available to Mr. Monroe, no further findings will here be attempted except as regards the species *A. furcatus*,

His assemblage of *A. furcatus* and *A. leptocaulis* appear to merge into each other. Many of them are without any sign of leaf laciniations, as his nos. 107 and 109 with "small heads" (12 mm. wide, well pressed) and nos. 106 and 108 with much wider heads (15–18 mm.), all of the same height, however, 10 mm., and about the same in number, though the lower cauline leaves on the latter plants have conspicuously longer petioles. They are all from Tweedy's Woods, Milwaukee County,[2] Aug. 28, 1910. These four numbers are revised to *A. furcatus* Burgess, *f. elaciniatus* Benke.[3] Mr. Monroe wished to ascertain the northern limit of this species, it not being well defined at the time, and by exchange material from me the forma was found as far north as Sheboygan County, Sept. 5, 1913, *Benke* mus. no. 28650.[4] Other specimens are from further north, but these have the typical leaf-base laciniations,[5] hence not the forma: *Aster furcatus*, Manitowoc, Aug. 31, 1913, *Benke* mus. nos. 28766 and 28770; also, Sept. 9, 1914, *Benke* mus. no 30123. Mr. Monroe reported having seen a specimen in the Field Museum Herbarium from yet further north. I have found it to be WISCON-

[2] When no state is given in this paper, Wisconsin is understood, and when no collectors name, Chas. E. Monroe.

[3] Benke, Am. Mid. Naturalist. XIII: 326 (1932).

[4] Numbers of the specimens are listed as those of Mr. Monroe; if unnumbered by him, those of the museum are given.

[5] Burgess, Mem. Torr. Bot. Club, XIII: 246 (1923) " . . . with broad laciniate-leaf bases."

SIN: Kewaunee County, July 30, 1892, *J. H. Schuette* Field Mus. no. 377243.[6]

In looking over herbarium specimens, it is noted that rays of this pure white species have a tendency to turn bluish. We see the importance of recording colors promptly in the field, which Mr. Monroe made a special point of doing.

Mr. Monroe uncovered a new color, very rare in this species. It is represented by his nos. 97–100, and by another series, nos. 118–122, all collected in Tweedy's Woods near Milwaukee, Aug. 2, 1914, the specimens stand out startlingly distinct even yet, some twenty years later, showing surprising fixedness in their rose-red tintings. Full justification is felt in separating this color form:

Aster furcatus Burgess, f. **erythractis,** f. nov., a specie radiis 11–19 roseo-rubris vel paullo purpurascentibus facile distinguitur.—WISCONSIN: Tweedy's Woods, Milwaukee County, Aug. 2, 1914. *Chas. E. Monroe* 97 (TYPE, Milwaukee Public Museum).

Rays 11–19, rose-red, to slight admixture of violet. All specimens examined, the nine numbers above listed, showed more or less leaf-base laciniations.

In his collections of *A. Shortii* are represented probably all its variations and forms besides the typical plants with blue rays and elongated ovate-lanceolate leaves. In several instances he has found the rare form with rose-red rays, or as he is wont to refer to this tinting, "pink"—*A. Shortii* Hook., f. *Gronemanni* Benke. Among these are: Story's Woods, Wauwatosa, Milwaukee County, Sept. 8, 1905, no. 1574; Waukesha, Waukesha County, Sept. 8, 1905, no. 1576; and OHIO: Elyria, Lorain County, Sept. 19, 1913, no. 1595.[7]

One variety of this species stands out boldly from the rest in his assemblage. It is of lusty growth and the middle and lower leaves are only about twice longer than broad—measurements of some: 4.5×7 cm., 6×9.5 cm., 4.5×8.5 cm. differing from the

[6] The revision of the name from *Aster corymbosus* Ait. bears the initials of Mr. Monroe over the label.

[7] A specimen of this form he donated to me—later by me to Field Museum herbarium—may be seen there. It is WISCONSIN: Story's Woods, Milwaukee County, Sept. 8, 1895, *Monroe* 936.

usual leaf-form, 3 to 4 times as long as broad. It is considered worthy of varietal rank, so I would segregate it as:

Aster Shortii Hook., var. **Monroei,** var nov., planta robusta; folia caulina media et inferiora duplo longiora quam lata interdum ovata vel fere rotundata; capitala vulgo paullo majora et bracteae latiores quam in forma typica.—WISCONSIN: Berryville, Kenosha County, Oct. 4, 1903. *Chas. E. Monroe* 1576 (TYPE, Milwaukee Public Museum).

Plants robust; middle and lower cauline leaves about half as wide as long, sometimes cordate-ovate or almost round; heads usually somewhat larger and bracts wider; otherwise with the species.

It is with genuine pleasure that I name this handsome variety for my friend and co-worker with the genus *Aster*, Charles E. Monroe.

This variety is rare in its Wisconsin-Illinois range, but appears to be common eastward, as specimens collected by Mr. Monroe in Ohio key to it. Two examples can here be cited, OHIO; Elyria, Lorain County, Oct. 1, 1909, no. 1577 (middle leaves about 5.5×9 cm.) and Lorain, Lorain County, Sept. 20, 1909, no. 1578, similar. A specimen,—WISCONSIN: Caledonia, Racine County, Sept, 14, 1902, no. 1590, has almost round leaves, and this specimen is not alone in this tendency in the assemblage.

Further, Mr. Monroe revealed yet another form having pure white rays, which has never been seen by me, either in the field or on record in *hortus siccus*. It is evidently very rare and here proposed as:

Aster Shortii Hook., f. **candidus,** f. nov., ligulae albae; forma rarissima—WISCONSIN: Johnson's Woods, Wauwatosa, Milwaukee County, Sept. 23, 1905. *Chas. E. Monroe* 1594 (TYPE, Milwaukee Public Museum).

With the species; rays pure white; form very rare.

No case of *A. patens* Ait. has been uncovered, although collectors have diligently searched for it, nor does it escape when cultivated. It has at times been erroneously listed from Wisconsin.

A. novae-angliae L., f. *genesseensis* House, quite rare, was taken by Mr. Monroe on one of his trips east, viz. OHIO: Oberlin, Lorain County, Sept. 28, 1909, no. 3110. Likewise, he has

some narrow-leaved specimens of *A. laevis* with leaves which grade in a series to the extreme measurement of 1×15 cm. He records these as *A. concinnus* Willd.; like Gray he suggests ambiguity of this species—even hybridism in cases. Specimens of these are WISCONSIN: Whitefish Bay, Milwaukee County, Aug. 17, 1903, no. 3082, and Lake Woods Ravine, Milwaukee County, Sept. 10, 1904, no. 3083.

Another series graduating in an interesting scale is that of *Aster pilosus* Willd., var *Pringlei* (Gray) Blake.[8] Some were collected in central Wisconsin, about Kilbourn, Sauk County where soils are light and sandy, and others are from North Bay in Door County, another region of light soil—an ecological factor which must not be disregarded in determining the taxonomic position of these plants. Mr. Monroe has entered them on his labels and in his lists under the name then commonly applied, *A. Pringlei* (Gray) Britton. The more northerly specimens (from North Bay) remind one of *A. polyphyllus* in general appearance.

In nos. 3331 to 3335, a series is listed as *A. commutatus* (T. & G.) Gray, all collected in Town of York, Racine County, Oct. 11, 1903. Later he doubted this determination himself.[9] My examination of them leads me to confirm his later suspicions and regard them as lusty extremes of *A. ericoides* L. (*A. multiflorus* Ait.),[10] the number of rays (about 20) and all other elements concurring. By this evidence, *A. commutatus* should be excluded from any Wisconsin list.

On one of my visits to him I gave Mr. Monroe some typical specimens of *A. longifolius* which I had collected in central Wisconsin,[11] which pleased him greatly as he had vainly sought this species, the typical plant being of rare occurrence. They are: Wautoma, Waushara County, Aug. 9, 1913, *Benke* nos. 3847 to 3849. In these the smooth outer bracts are almost entirely green, subequal with the inner and the purple rays have a shade of roseate admixture. Nearly all plants of this species seen in herbaria deviate much from the type in leaf-form, in the bracts usually in a well defined series rather than subequal and

[8] Blake, Rhodora **32**: 140 (1930).
[9] Monroe, Bull. Wis. Nat. Hist. Soc. **11**: 99–100 (1913).
[10] Blake, Rhodora **32**: 138 (1930).
[11] Monroe, Bull. Wis. Nat. Hist. Soc. **11**: 102 (1913).

in having white rays; in many cases they agree better with related species.

A. prenanthoides is to be regarded as local in Wisconsin, ranging scarcely beyond the confines of Milwaukee County. Yet in this limited state-range Mr. Monroe has shown a striking new color form:

Aster prenanthoides Muhl., f. **milwaukeensis** f. nov., ligulae albae; forma rara et ut videtur localis.—WISCONSIN: Lake Woods, Milwaukee County, Sept. 10, 1904, *Monroe* 3908 (TYPE, Milwaukee Public Museum).

Rays pure white, the form rare and apparently local.[12]

In his collection is also found a pure white-rayed sample of *A. puniceus* L., f. *albiflorus* Farwell, Elkhart Lake, Sheboygan County, Sept. 21, 1902, no. 3936—his field-notes state: "Rays glistening white."

A. umbellatus Mill., var. *pubens* Gray is rare in Wisconsin, though the species is quite common. The well defined specimens are: Nekoosa, Wood County, Sept. 14, 1912, *Benke* 4016; Saltenberger Lake, Vilas County, Aug. 19, 1915, *Milwaukee Science Club*, mus. no. 32318; Kinnickinic, St. Croix County, Sept. 8, 1923, *A. M. Fuller* mus. no. 68718. Mr. Fuller's specimen has much wider leaves than the other two, it should be noted, leading to the var. *latifolius* Gray, of which it might become a forma on further study.

A. linariifolius is rare in the state, Mr. Monroe having collected but a single specimen. It is: Kilbourn, Adams County, Sept. 3, 1905, no. 4121. Other collectors, too, found it but rarely, as Busseyville, Jefferson County, 1850–1860, *T. Kumlien (Kumlein?)* mus. no. 425; (locality not given), Jefferson County, Sept. 24, 1892, *John W. Dunlap*, mus. no. 9305; and Baraboo, Sauk County, Sept. 13, 1912, *Chas. Goessl* mus. no. 30416.

Hybridism, which makes determination difficult at times, does not occur as often as some may believe. It is more likely that extreme forms of leaf, inflorescence, pubescence and other taxonomic factors in related species that may almost merge, should be regarded as either varieties or formas, depending on the view-point of the taxonomist, rather than as hybrids. During

[12] Another specimen is Lake Woods, Milwaukee County, Oct. 10, 1903, no. 405 given me by way of exchange (Feb. 13, 1913), now in Field Mus. of Nat. Hist. Chicago.

my experience over much territory and many years I have seen countless plants, for example, of *A. novae-angliae* grow with *A. ericoides*, yet have very seldom met with *A. amethystinus* evidently a hybrid of these two.[13] Mr. Monroe was chary of declaring hybridism; he rather considered the influences of environmental factors in working with difficult specimens.

When a series of diverging specimens in a species is arranged from one extreme to another the gradations become apparent, acting to deter workers from announcing a multiplicity of varieties and forms to which they might well be tempted if intermediate patterns were missing.

Special thanks are owing Curator Albert M. Fuller of the Department of Botany, through whose kindness every facility of the Milwaukee Public Museum was placed at my disposal.

Chicago, Ill.

[13] Benke, Rhodora **32**: 1–2 (1930).

Pine and cherry from the Calvert Miocene

Edward W. Berry

The presence of land plants in the marine sediments of the Middle Atlantic States Miocene is an infrequent occurrence and is for the most part confined to a very limited number of localities in the near shore deposits of the Calvert formation.

In 1916 twenty-six species of plants were enumerated:[1] 16 from Richmond, Virginia, and 17 from two localities in the District of Columbia, 7 being common to the two regions. This flora included a Salvinia, 2 conifers and 23 dicotyledons. Leguminous leaflets and oak leaves predominate among the last and cypress was the most common form at Richmond.

These plants indicated a middle Miocene age, probably to be correlated with the Tortonian stage of Europe. Ecologically the Richmond forms appeared to indicate a low coast lined with cypress swamps and an inconsiderable run-off, and the District of Columbia forms indicated that they grew among coastal dunes.

Despite the fact that the fossiliferous Miocene of tidewater Maryland and Virginia has attracted the attention of geologists for more than 2 centuries and is visited annually by scores of students interested in collecting shells, the bones of marine mammals and other sea life preserved in these Miocene sediments, no traces of land plants have, so far as I know, been recorded from the classic outcrops such as those of the Calvert Cliffs along the western shore of Chesapeake Bay or those along Potomac River until the summer of 1933, when two specimens of a new species of walnut were discovered—one in Zone 11 at a locality $1\frac{1}{2}$ miles south of Plum Point in the Calvert Cliffs, and the second at Richmond, Virginia.[2]

During the summer of 1935 a fairly well preserved pine cone was collected from Zone 11 at a point 1.7 miles south of Plum Point, and a stone of a Prunus was collected from the Nomini

[1] Berry, Edward W. The physical conditions indicated by the Flora of the Calvert formation. U. S. Geol. Survey Prof. Paper 98, pp. 61–73, pls. 11, 12, 1916.

[2] A Walnut from the Chesapeake Miocene. Jour. Wash. Acad. Sci., vol. 24, pp. 227–229, 1934.

Cliffs on the right bank of the Potomac in Westmoreland County, Virginia. It is the purpose of the present note to describe these two occurrences.

Pinus collinsi n. sp. Figure 2

Although the pine cone is too incompletely preserved to be given a distinctive diagnosis it is probably a new species, since,

Fig. 1. Prunus calvertensis, Berry, n.sp.
Fig. 2. Pinus collinsi, Berry, n.sp.

with the exception of the seed of a Pinus to be mentioned presently, it is the only trace of Pinus known from eastern North America in the interval between the Eocene and the Pleistocene. The specimen clearly belongs in the genus Pinus and since it seems preferable to give it a specific name it is named for the collector, R. Lee Collins.

The specimen, which is incomplete at the base, is 8 centimeters long and about 3 centimeters in diameter. The scales are thin; somewhat, but not greatly thickened and umbonate distad, unarmed, about a centimeter in width and 2 centimeters or

slightly more in length in the central part of the cone, becoming progressively smaller in the upper part of the cone.

The specimen had evidently been in the water a long time before it sank to the bottom and was buried by sediment, since some of the basal scales had dropped off and the lignite is brittle and structureless. It is impossible to locate the fossil among the different sections of the genus. It could belong to the white pine group among the soft pines, although our modern species in this group have larger cones, or it could be related to some of the pitch pines in which the prickles may be poorly developed or fall when the cones open.

Naturally one does not expect a Miocene species to be especially close to an existing species and I have no useful comparisons to make with recent cones. Nor is there any merit in comparisons with Miocene cones from other and far distant floral provinces. Almost any modern unarmed pine cone of about the same size would have much the appearance of this badly preserved fossil specimen.

It is interesting in this connection to call attention to a single, and not especially well preserved, seed of Pinus described from the District of Columbia.[3] This could easily belong to the same botanical species as the present cone.

Locality: 1.7 mi. south of Plum Point, Calvert Co., Md.

Horizon: Zone 11 of Calvert formation, about 6 ft. above the base of the zone.

Collector: R. Lee Collins, July, 1935.

Prunus calvertensis n. sp. Figure 1

Stone somewhat compressed, nearly circular in profile, about 1.4×1.6 centimeters in length and width, and 8 millimeters in maximum thickness. The lignite is structureless, but after photographing the single specimen it was cut across and the interior is completely filled by what is interpreted as a single seed. The surface of the stone is rugose throughout as shown in the accompanying illustration.

The specimen has been compared with various Cornaceae, Tiliaceae, Elaeocarpaceae, Celtis, Zizyphus, Grewia, Zanthoxylong, etc. with unsatisfactory results and appears to belong to

[3] Op. cit. p. 66, pl. 12, figure 1.

Prunus. Naturally a single stone (pit) is not much of a basis for a new species, but the likelihood of finding even a second specimen is remote.

The genus is widely distributed in modern floras of the North Temperate Zone with about 125 species and many cultivated varieties. Baillon segregated it in 9 sections and Focke uses seven. Several of these, e.g. *Amygdalus* are undoubtedly entitled to generic rank. The fossil obviously does not belong to the plum, almond or peach tribes but might well be related to the cherries.

No useful comparisons with existing species are possible nor does the fossil appear to be close to any of the existing North American species, but it is impossible to get far with the stones alone, nor de we know the factors making for rugosity, although some authors are inclined to think it has a relation to increased size of the fleshy exocarp, and this is partly borne out by the features in horticultural hybrids.

No leaves of Prunus are known from the Miocene of eastern North America. Without checking the identifications it may be said that about 80 fossil species of Prunus have been described ranging in time from the Upper Cretaceous through the Pleistocene and reaching a maximum in the Miocene. They are all confined to the Northern Hemisphere, and beginning with the Eocene a considerable number, about half the total known, are represented by fruits. Among these the one which appears most similar to *Prunus calvertensis*, although it is doubtful if this is of any real significance, is a form from the Pliocene of Swalmen, Holland which is referred by the Reids to *Prunus spinosa* Linné.

Locality: Nomini Cliffs (bluff named Horsehead on Coast Survey Chart).

Horizon: Zone not determined.

Collector: Charles T. Berry, June, 1935.

Johns Hopkins University
Baltimore, Md.

Copper in plants

D. T. MacDougal

The recent note by Dr. R. M. Harper in Torreya, November–December 1935, dealing with copper in plants, impels me to recall a note by myself on this topic in the Botanical Gazette, January 1899, page 69. This note was descriptive of the presence of copper in the wood of a tree of *Quercus macrocarpa* which had been submitted to the Department of Chemistry of the University of Minnesota for analysis. The metal was found "in the form of finely divided, reddish brown particles in the tracheides, vessels, and medullary parenchyma." This deposit was marked in about ten of the annual rings and in a quantity amounting to 500 mg. to each kilo of dry wood, of which it thus formed a proportion by weight of 0.5 per cent.

Although no investigation was made of the soil in which the tree grew it was assumed that the metal was absorbed from float copper from the formations in the Lake Superior region. While at the time the examination was made it was assumed that the tree had been absorbing copper for a decade it is now known that the ascending sap in the oaks may occupy many layers at one time. The tree may have therefore taken up all the copper found in one year. Whether its death was the result of such absorption was not known.

My own studies in movements of sap in plants throws no light on the mechanism by which this metal was found to be chiefly concentrated in the bark of several plants including the willow, as cited by Harper. No case of actual excretion from the sap conducting layers out through the cambium is known and the presence of a high proportion of metal in the bark consequently presents an interesting puzzle.

At the time of the preparation of my original note I had access only to the paper by Skertchly, mentioned by Harper, and to one by Lehman (Der Kupfergehalt von Pflanzen und Thieren in kupferreichen Gegenden. Archiv für Hygiene 27: 1. 1896). The last named found that specimens of plants grown in ordinary soils may contain as much as 30 mg. of copper to each kilo of dry matter while others in copper-rich soils yielded as much as 560 mg. of the metal per kilo of dry matter.

Carmel, Cal.

FIELD TRIPS OF THE CLUB

Trip of May 22–24 to "The Pines," Branchville, New Jersey

The rapid succession of geological formations in this delightful region of northwestern New Jersey still makes it possible for any botanist to find much of interest: the limestone ridge on which the hotel stands, with its ledges which shelter rock ferns such as *Asplenium cryptolepis*, *Pellaea atropurpurea* and *Camptosorus rhizophyllus;* the high sandstone escarpment to the eastward with purple-flowering clematis, and the intervening gorge with its perpetually cool boulder slopes supporting a rich growth of hemlock, red-fruited elder, and a variety of ferns, among them Goldie's; the dry shale hilltops with a profusion of dwarf *Amelanchier* and *Viburnum*. Even in this often-visited area, surprises are constantly appearing, and we can now report a most unusual sedge, new to New Jersey and to the Torrey Club range. It is a northern species, *Carex Backii* (*C. durifolia* of Britton & Brown's Illustrated Flora), growing in clumps a foot in diameter, with narrow glossy leaves and an inflorescence enveloped by gigantic bracts; its nearest New York outposts are, so far as I have been able to discover, in Jefferson and St. Lawrence Counties, and otherwise it approaches us closely only in southwestern Vermont, and on Mount Toby near Amherst, Massachusetts. The colony, growing on the shaded limestone ridge about a hundred yards north of the hotel, consists of only a dozen plants.

In woodlands adjacent to the hotel grounds, one finds abundant colonies of the larger yellow Lady Slipper and two interesting liliacous plants, *Chamaelirium luteum* and *Melanthium latifolium*, clumps of the low grass-like *Scirpus planifolius*, and occasional patches of *Carex gracilescens* Steud., one of the uncommon segregates of *C. laxiflora*. Among the plants found around an old quarry a half mile south of Branchville were *Sisyrinchium mucronatum* and *Convolvulus spithamaeus*, the latter not yet in flower.

As a flying squadron of automobiles, we proceeded on Saturday afternoon to Moody's Rock, a somewhat inaccessible retreat among the eroded limestones just to the northwest of

Springdale. This overhanging ledge borders on a bog, somewhat similar to the extensive bog-center of Muckshaw Swamp, lying a short distance to the southwest. Here were pitcher plants, cranberries, *Eriophorum viridi-carinatum*, the curious native buckbean (*Menyanthes trifoliata* var. *minor*), dwarf birch (*Betula pumila*), bog willow (*Salix pedicellaris* var. *hypoglauca*), and numerous plants of *Carex seorsa*, one of the most infrequent members of the *Stellulatae* group. A small pond, lying between the bog and the Springdale road, filled with the golden spikes of *Orontium*, showed also small patches of the yellow Cow-lily (*Nymphozanthus advena*), and its shores were lined by clumps of *Carex diandra*, a northern species of wet calcareous habitat. *Orontium* itself shows the most amazing diversity of habitat; being equally at home in the acidic pine barrens of New Jersey, the dense swamps of Georgia, in shallow streams of the Cumberland Mountains, and in the marly ponds of western New Jersey. Toward its existence the enormously deep roots are probably the most important contributor.

With the owner's permission, we later visited the extensive Muckshaw Swamp, with a few clumps of the showy ladies' slipper (*Cypripedium reginae*) still to be seen, and an abundance of yellow ladies' slippers, both large and small-flowered. Flowers of the small variety, confined to wet swampy places, were occasionally found to have a delicious fragrance. At the margin of one of the numerous embayments we saw again, as we had found it in the previous year, the splendid stand of Goldie's Fern, and the luxuriant plants representing a natural hybrid between this species and the marginal shield fern.

To the list of plants observed in 1935 at the "Pines" by Dr. Moldenke may be added: *Marchantia polymorpha, Carex cephalophora, C. convoluta, C. amphibola C. oligocarpa, C. Backii, C. laxiculmis, C. laxiflora, C. histricina. Polygonatum pubescens, Staphylea trifolia, Quercus rubra, Krigia amplexicaulis, Cardamine pennsylvanica.*

Henry K. Svenson

Trip of June 20 to Englewood Cliffs

A small group went through the woods on the Palisades and along the brook to a swamp. Besides the usual plants of such

situations, a number of less common ones were seen, most of them pointed out by Dr. Svenson.

Eupatorium trifoliatum and *E. purpureum* were found together, growing abundantly along the road.

In spite of the constant cutting of wood on the area, such plants as *Adiantum pedatum*, *Mitchella repens* and *Asclepias phytolaccoides* were still in evidence. *Melanthium latifolium* was found on a hillside, *Conopholis americana* under an oak, and along the brook *Athyrium acrostichoides* and *Isoetes Engelmanni*. *Typha angustifolia*, far from its usual salt marsh habitat, was found in a marsh along with *T. latifolia*. Some of the less common sedges seen were *Carex projecta*, *C. prasina*, and *C. laevivaginata*.

Hester W. Rusk

NEWS NOTES

Dr. A. H. Reginald Buller, first professor of botany at the University of Manitoba, has resigned the chair which he has held for over thirty years and has been appointed professor emeritus. He proposes to continue his botanical studies in England with headquarters at the Herbarium of the Royal Botanical Gardens, Kew, Surrey.

At the commencement exercises at Harvard University in June the doctorate of science was conferred on Dr. Elmer D. Merrill, until last year Director of the New York Botanical Garden and now Administrator of the Harvard botanical units. The citation accompanying the degree was "Elmer Drew Merrill, a botanist famed for his investigations of the flora of the Philippines, an administrator marked by his effectiveness in many posts."

In the Twenty-fifth annual report of the Brooklyn Botanic Garden, Dr. Arthur H. Graves reports on the work being done toward breeding a chestnut that will be of timber value and immune to the chestnut blight. At present there are growing on trial grounds at Hamden, Conn., specimens of American, Spanish, Chinese and Japanese chestnuts with a large variety of hybrids between the various species. Last year seeds were secured of a cross of the American and Chinese species, using

the American as the female parent. Some of the hybrid trees have been attacked by the blight but others seem to be immune.

The 1936 drought is one of the most serious and widespread the nation has ever experienced. Not only have there been untold suffering by the local residents and terrific losses in crops, but other forms of life over considerable areas are showing the effects of abnormally high temperatures and deficient precipitation. Just how serious some of these effects are remains to be seen.

As information on drought resistance of trees and shrubs is sadly lacking, the present affords an unusual opportunity to obtain data of outstanding value. Consequently, it is hoped that those who are in a position to do so will take notes on the reaction of various plants to the drought.

The Forest Service is undertaking the collection of data on the drought damage. In this it is seeking the aid of botanists, and other interested individuals throughout the drought area. Anyone with observations on species behavior should communicate them to the Division of Silvics of the Forest Service at Washington, D. C. Data are desired especially on such features as the nature, extent, and character of the damage, the relative resistance of trees growing on different sites, the comparative ability of native and exotic trees to withstand drought and the nature and extent of the damage to stands or to shade or ornamental trees, shrubs, etc. A questionnaire covering these points has been drawn up to aid observers in reporting the effects of the current drought.

Boris A. Krukoff, of the New York Botanical Garden, sailed recently for Brazil, where he will continue his work on the poisonous plants of the Amazon territory. (Science)

THE TORREY BOTANICAL CLUB

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John Torrey, 1796-1873

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TORREYA

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Deuterium and living organisms

Robertson Pratt

The existence of more than one variety of water is of great interest to physiologists, and during the three years that deuterium oxide, or heavy water, has been available for research many investigators have studied its influence on plants and animals.

Soon after Urey and his associates (33, 34)[1] isolated deuterium, an isotope of hydrogen, methods were developed for the concentration of D_2O, or deuterium oxide, from water by means of electrolysis. Nearly all samples of water, whether from the ocean, fresh water lakes, or formed by the combustion of organic matter, contain about 1 part in 5000, or 0.02 per cent, D_2O by weight. To isolate the D_2O from water, use is made of the well known fact that when an electric current passes through water, oxygen and hydrogen are liberated at the electrodes.[2] At first relatively more light than heavy hydrogen is liberated. Consequently as the treatment proceeds the ratio of heavy to light hydrogen in the residue increases and ultimately oxygen and deuterium are liberated. The gases are then burned and just as two atoms of hydrogen (mass = 1) may combine with one atom of oxygen to form a molecule of H_2O, so two atoms of deuterium (mass = 2) combine with one of oxygen to form D_2O. The cost of the current consumed is the greatest item of expense in this procedure, but improved methods and increased efficiency have combined to reduce the cost of production from about one dollar to approximately ten cents a drop.

Influence of D_2O on growth.—High concentrations of D_2O have been found in a number of cases to exert a depressing action on the normal growth of plants and animals. Tobacco seeds were found to sprout slowly in 50 per cent D_2O and not at all in 100 per cent D_2O (14, 15). Seeds were not killed, how-

[1] Numbers in parentheses refer to literature citations.

[2] In practice a dilute sodium hydroxide solution is prepared with the water to be concentrated. This facilitates electrolysis (4).

ever, for upon removal after three weeks to ordinary water they sprouted, although their development was somewhat abnormal. In other studies the rate of development of frogs' eggs decreased as the concentration of D_2O increased from 5 per cent to 30 per cent (35) and the development of fertilized sea urchins' eggs was promptly arrested when they were placed in contact with 99.5 per cent D_2O (17).

Neither bacteria nor lower plants are immune to the action of D_2O. Species of luminous bacteria and of *Euglena* failed to grow in concentrated heavy water, but it was observed that transfer to ordinary water after forty-one and nine days, respectively, resulted in renewal of normal growth (11). Other investigators found that different species of unicellular green algae did not grow if the D_2O content of the nutrient solution exceeded 85 per cent, although cells survived exposure to high concentrations for several days and resumed growth when returned to culture media with low concentrations (25). Fungus mycelia behaved similarly (13). The spores of the fungus that produces the powdery mildew disease of wheat also proved to be useful in a detailed study of the influence of D_2O on growth (22a). Elongation of the germ tubes was studied in concentrations ranging from 0.02 to 100 per cent. It was found that D_2O reduced the maximum rate and final amount of growth, that elongation of germ-tubes was promptly arrested when spores were placed in 100 per cent D_2O, and that spores were more sensitive to the deleterious action of D_2O after growth had begun in H_2O. Practically no growth occurred when the D_2O concentration was greater than 75 per cent.

Within certain limits of time, spores were not killed by exposure to 100 per cent D_2O, since upon return to H_2O they resumed growth. It was clear, however, that the injury resulting from prolonged exposure was, at least in part, irreversible. With exposures ranging from 24 to 124 hours, the length which germ tubes attained and the duration of the growth period in H_2O were inversely related to the previous period of immersion in 100 per cent D_2O.

Since high concentrations of D_2O exert a marked depressing action on normal growth, several investigators have tested this agent as a possible tool to be used in the treatment of cancers and other abnormal growths. Their efforts have all been unsuccessful. Under the conditions of the experiments, rodent tumors

and cancers have outwardly been entirely unaffected by concentrated or dilute D_2O (23, 29, 30, 37).

One experimenter failed to note any significant effect of 94 per cent D_2O on cell division of germinating wheat embryos (19) and another reported that the growth of *Staphylococcus* sp. and the typhus bacillus was unaffected over a period of 70 days by 92–94 per cent D_2O (10).

Stimulation of organisms exposed to dilute D_2O—i.e., concentrations less than 1 per cent—has been reported. Improved growth of various species of protozoa, bacteria, algae, fungi, and green plants has been said to result from treatment with 0.05–0.13 per cent D_2O (1, 9, 20, 26). Slight inhibition of the germination of *Lupinus* seeds and growth of the seedlings has also been reported (18).

Other workers, however, have been unable to detect any influence of carefully purified dilute heavy water on living organisms. In a number of experiments cultures of several species of protozoa, luminous bacteria, soil bacteria, and different pathogenic organisms (in vivo and in vitro) were not influenced by dilute D_2O (5, 11, 27). In other tests, fungi and the roots of wheat plants grew equally well in 0.46 per cent D_2O and in H_2O (7, 22).

Influence of D_2O on photosynthesis.—A study of the influence of D_2O on photosynthesis is of particular interest, since water enters directly into the chemical reactions at one stage of the process. Many investigators have determined the effect of varying CO_2 concentration, light intensity, temperature, and other factors upon the photosynthetic process, and important hypotheses and theories of the mechanism of photosynthesis have been derived from their observations. For obvious reasons, however, it has been difficult to determine the rôle of H_2O in the process, but now the use of D_2O suggests an approach to this important problem.

Preliminary reports from different laboratories show that photosynthesis is considerably reduced in heavy water. For example, it was found from direct measurements that with 99.9 per cent D_2O photosynthesis in the unicellular green alga *Chlorella* sp. was 0.41 of that with H_2O (8). This figure closely approximates the earlier estimate (based on chemical analyses of algae cultured in D_2O) that D is assimilated 41 per cent as rapidly as H (24).

Influence of D_2O on respiration.—The respiration of several organisms has also been studied and found to be markedly retarded in the higher concentrations of D_2O. In one series of experiments the oxygen consumption of luminous bacteria decreased rapidly as the concentration of D_2O increased from 0.02 to 86 per cent and extrapolation of the curve representing respiration as a function of D_2O concentration indicated zero respiration in 100 per cent heavy water (12). Other experiments showed that the oxygen consumption of yeast (32) and green algae (6) was reduced about one half in 100 per cent D_2O but that dilute D_2O had no influence on the respiration of wheat seedlings (7) or of yeast (32).

Influence of D_2O on muscles and nerves.—There has been much speculation concerning the effect of D_2O on nerve and muscle action, although few detailed experiments have been reported. It is clear, however, that some muscles at least are very sensitive to D_2O. Carefully controlled experiments (36) showed that the strength and frequency of the beat of isolated frogs' hearts were progressively diminished as the concentration of D_2O in Ringer's solution was increased from 0.02 to 99.2 per cent. The deleterious effect on hearts and other muscles was evident immediately, but D_2O seemed to have no influence on the nerves studied.

Mechanism of the action of D_2O on physiological processes.—The influence of D_2O on the rates of several physiological processes is well known, but the cause of the action is not clear.[3]

Evidence in the literature indicates that, with the possible exception of the membranes of mammalian erythrocytes (3, 21), cell membranes do not differ significantly in permeability to concentrated D_2O and to H_2O, and that the two liquids are not markedly different in ability to participate in establishing osmotic pressure (8, 17, 22).

Numerous chemical studies have shown that when sugars, cellulose, and many other organic and inorganic compounds are placed in contact with D_2O labile H atoms are quickly replaced by D atoms, and that the activity of the deuterium compound formed usually differs to a greater or lesser extent from that of the original compound (22). Similar exchanges probably occur

[3] It should be observed that the sensitiveness of different species of organisms to D_2O varies considerably and is not clearly correlated with their phylogenetic positions.

when living cells are immersed in D_2O (2). Thus the activities of different intracellular compounds, and hence the relative velocities of various reactions, may be altered when cells are exposed to D_2O. Since disturbance of the normal relative rates of physiological processes may cause serious injury to plants and animals, it seems possible that D_2O influences life processes by altering the established rate relations of mutually dependent intracellular reactions. Other chemical studies have shown that the ratio of the dissociated to the undissociated forms of several compounds changes when D_2O is substituted for H_2O as the solvent (16, 31). The ratio of dissociated to undissociated molecules in protoplasm might, therefore, be quite different in the two liquids. This kind of disturbance might seriously alter the relative rates of essential reactions in living cells and account for the observed effect of D_2O on living organisms.

D as an indicator in metabolism.—Although the initial and end products of many physiological processes are known, the intermediate steps by which one is converted into the other are, in many instances, unknown. Recent investigations indicate that the metabolic systems of mice and dogs are unable to distinguish some fatty acids hydrogenated with deuterium from those similarly treated with hydrogen. The analytical chemist can, however, detect the slight difference. Thus by feeding these compounds to animals and later analyzing their body fluids it is possible to trace the intermediate steps in different processes and to obtain elusive information about normal metabolism. For example, physiologists found that even when animals were fed a diet insufficient to maintain their weight, the fat in the diet was not available for use directly, but had first to be deposited in the fat depots (28), and in another experiment it was possible to trace several intermediate steps in the metabolism of the important substance cholesterol in dogs and to obtain information concerning its behavior in man.

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An interesting Oak in New York City with brief notes on *Quercus Richteri* Baen.

Leon Croizat

A curious Oak has recently come to the attention of the writer in Fort Washington Park, Manhattan. The specimen grows very close to the drive projected along the Hudson River and now in course of construction. Thanks to the interest of Mr. G. D. Clarke, consulting landscape architect, and of the officials of the Department of Parks efforts are being made to preserve this tree.

This Oak is slightly more than 22 inches in diameter and about 55 feet tall. It is located approximately one quarter of a mile north from the foot of the slope crowned by the Pavilion on Riverside Drive, which on the city maps stands almost in line with West 190th Street, across Fort Tryon Park.

The bark at the bole does not materially differ from the bark of specimens of the red oak (*Quercus borealis*) of like size. The main limbs arise 20 feet above the ground and tend to be pendulous in the lowest tiers, wholly ascending above. The crown is open, nearly dome-shaped.

The leaves are borne in lax whorls at the extremity of the glabrous branchlets. Their texture, except where altered as explained below, is exactly that of *Q. borealis*. They are dark green with more or less of a bloom beneath as usual with the leaves of that species. A juvenile covering of minute fascicled and stellate hairs is suggested by the few persistent trichomes of adult leaves at the margin of the blade. Leaves of late growth, however, are subglabrous to glabrous on unfolding.

The size of the leaf suggests the Red Oak's but the outline is not the usual one of the species. The upper half to two thirds of the blade shows some 5 acuminate, long and narrow lobes, 1–5-toothed, the teeth long-aristate. The sinuses are mostly narrow, irregular in outline, some triangular with the opposite margins overlapping, others more or less openly quadrangular, the bottom of the sinus almost parallel with the midrib. The lower half or third tends to be abruptly constricted, the blade-tissue in some leaves barely exceeding the thickness of the mid-

rib and of the primaries: here the lobes are much shorter, distinctly irregular as to depth, outline and indentation. In brief, the blade is subflabellate, obovate in outline, much narrowed at the base.

The irregularity of the veins matches that of the blade. In the upper half to two thirds the primaries resemble in the main those of *Q. borealis*. Below they are coarser; they usually start at a narrow angle from the midrib, then turn sharply outwards to end in the tip of the lobe. This peculiar design is matched by the equally peculiar rough tissue of the blade; not infrequently this tissue wears down to translucent patches like the calloused margin of the blade. On the spurs of the twigs and branches shallowly lobed or nearly unlobed leaves occur. Only occasional leaves are not constricted at the base.

The wood of the twig is dark- to olive-brown usually with a grayish glossy cast, quite brittle. The bud, seen in September, is like that of *Q. borealis* but may have fewer scales. The fruit also has the earmarks of the Red Oak's. The cupule is cup-shaped, short-pedunculate, glabrous inside, covered with about 10 rows of triangular scales puberulous at first, later glabrous or sparingly scurfy-hairy at the margins. About $\frac{1}{4}$ of the acorn is inclosed by the cupule.

The possibility of the tree under discussion being a hybrid between the Red and the Pin Oak (for which *Q. Richteri* Baen. is believed to be valid) may be suggested but the writer believes none of its characters warrant this assumption. Cultivars from manifestly good species in *Fagus*, *Acer*, *Tilia*, etc., exhibit aberrant patterns of venation and leaf such as are also found in certain hybrids of *Quercus*, *Ulmus*, *Philadelphus*, *Sorbus*, *Crataegus*, *Malus*, *Amygdalus*, *Aesculus* and *Tilia*, and occasionally, in single leaves of most any plant. The habit of a tree is apt to show individual variations, and is always modified by the immediate environment. In distinctly pubescent species (e.g., *Tilia platyphyllos*) leaves of late growth are normally glabrous or subglabrous. The discussion could easily be extended noticing, for instance, that an Oak of mixed descent (e.g., *Q. runcinata*) may bear fruits in fair amount, and that these fruits are like those of one parent (*Q. maxima*), hybridism showing almost exclusively in the leaf which thus may tend to assume diagnostic value. The widest divergence of opinions obtains in

these matters. The balance of probability, however, indicates that we are dealing with a teratological case involving an otherwise pure strain of the Red Oak.

To dispose of this tree in nomenclature is not without difficulty. It manifestly does not deserve rank as species, subspecies, variety or form in the orthodox taxonomic sense. Its presentation as an horticultural variety seems to be not wholly objectionable. The specimen belongs to a species well known in cultivation, grows in a public park, and is a precise match of such accepted varieties as *Quercus robur* var. *heterophylla* and *Acer platanoides* var. *laciniatum*. It may be said that the use of horticultural variety is unbecoming whenever the specimen on which the variety is established is not in cultivation. The objection has some merit, but it assumes for certain that our Oak will not be cultivated and reproduced. This much, of course, does not belong to the record as proved. The writer, therefore, announces: *Quercus borealis* Michx var. (hort.) nov. **flabellata** —Lamina plerumque basi abrupte irregulariter constricta dentata, figura quoadmodum flabellata (Blade usually abruptly and irregularly constricted dentate at the base, in outline more or less flabellate).—Type in the Herbarium of the N. Y. Botanical Garden, leg. Leon Croizat, August 31, 1936. *Sizes:* Leaf up to 9 inches long, the petiole about $1\frac{1}{4}$ of an inch, the entire median part of the blade not over $2–2\frac{1}{2}$ inches broad, with lobes up to $2\frac{1}{2}$ inches long, 2 inches broad. Acorn to 1 inch long, $\frac{3}{4}$ of an inch broad, inclosed about $\frac{1}{4}$ by the cupule; cupule up to $\frac{1}{4}$ of an inch deep.

Baenitz presented (Allg. Bot. Zeitschr. **9**: 85 *et seq.*, 1903) *Quercus Richteri* for *Q. borealis var. maxima*×*Q. palustris*. The discussion that justifies the presentation of the binomial is convincing so far as the cited text reads, and *Q. Richteri* has found place in standard works, in some of which it is briefly described. The writer, thanks to the kindness of Dr. E. J. Palmer, has seen the specimens of *Q. Richteri* preserved in the herbarium of the Arnold Arboretum. On the strength of an isotype (Dr. C. Baenitz, Herbarium Dendrologicum No. —, Flora Silesiaca, 1/10–12/10 1902; without fruit) *Q. Richteri* is justifiably reduced to a synonym of *Q. coccinea* Moench. Three specimens (Juli 1903 leg. Herrenhausen; 28.v.1904 "Original Baum"; 28.v. 1904 leg. C. K. Schneider, Scheitniger Park Breslau, "Original

Baum") from the "Herbarium Dendrologicum C. K. Schneider" confirm that *Q. Richteri* is synonymous with *Q. coccinea*. It should be remarked that on the last cited sheet appears the mss. note "Sieht aus wie (*Q.*) *coccinea*" in which, it seems, C. K. Schneider very mildly states the essential fact. The two American collections represent wholly distinct trees. One (Kellog, Herbarium Americanum, October 11, 1907, Osage, Mo.) appears to the writer inextricable from certain critical forms of the group *Q. rubra-Q. palustris L.* The other specimen (E. J. Palmer, Plants of Missouri, No. 26358) is a very interesting sample. The leaf suggests *Q. ellipsoidalis* E. J. Hill, but the acorn and cupule resemble the fruit of *Q. runcinata* Engelm., consequently that of *Q. maxima* (Marsh.) Ashe. This Oak may well represent a hybrid but, unfortunately, can not remain under *Q. Richteri* because the binomial must follow the type.

New York City

Is Acorus Calamus native in the United States?

Roland M. Harper

Acorus Calamus L., commonly known as calamus or sweet flag which differs markedly from all our other Araceae in having linear erect equitant leaves, and in being aromatic instead of acrid, is generally treated in current manuals as native throughout the eastern United States, and occurring also in Europe and Asia. Its aromatic rootstock was formerly regarded as an important medicine, though its popularity was evidently waning as long ago as 1855, when John Darby said of it in his Botany of the Southern States: "It was anciently much more highly esteemed than at the present day." In the South it seems to be used mostly by negroes, and it is referred to in the "Uncle Remus" stories of two generations ago as a favorite condiment.

I do not have access to much botanical literature at present, but will quote a few statements about *Acorus* that I have found, which may be representative enough; taking them in chronological order.

Stephen Elliott, in his Botany of South Carolina and Georgia (1821) says of it: "Grows in wet places, around ponds, etc., near settlements; naturalized but scarcely indigenous."

William Darlington, in his Flora Cestrica (i.e., of Chester County, Pennsylvania) (1837) says: "Swampy meadows; about springheads; frequent. . . . Our American Botanists speak of it as being undoubtedly indigenous; but I have never seen it where it did not appear like an introduced plant."

Darby, in the book above referred to, gives its distribution only as "wet places." He was living at the time in Auburn, Alabama, and may have seen the plant in that vicinity.

A. W. Chapman, in his Flora of the Southern United States (1860), says of *Acorus:* "Wet places, Florida, and northward, apparently introduced."

F. P. Porcher, in his Resources of the Southern Fields and Forests (1863), says: "Diffused in bogs and morasses; I have collected it in Fairfield and in Charleston districts" (now counties, in South Carolina). He devotes about a page to its medicinal properties, citing several authorities who had written about it.

Alphonso Wood, in his Class Book of Botany (various editions, around 1870), says: "Grows in wet soils throughout the United States."

Britton and Brown, in the first volume of their illustrated Flora (1896), give the habitat of *Acorus* as "In swamps and along streams," with a range from Nova Scotia to Minnesota, Louisiana and Kansas, also in Europe and Asia. They make the interesting observation that "In our territory fruit is rarely, if ever, found."

Gattinger, in his Flora of Tennessee (second edition, 1901), says of it: "E. Tenn. Perhaps from imported stock. Cultivated here and there."

Mohr, in his Plant Life of Alabama (1901), gives its general distribution elsewhere, and then says: "Scattered over the State. Border of swamps. Mobile and Montgomery counties." There is no hint that it may not be indigenous, and the same idea prevails in Small's Flora of the Southeastern United States (1903), and his Manual of the Southeastern Flora (1933). Millspaugh, in his Flora of West Virginia (1913), cites seven stations for it, with no intimation that it might not have been there always.

It may be noted that several of the writers previous to the Civil War were skeptical about its being indigenous, but less skepticism seems to have been expressed since; as if the plant was gradually making itself more at home, so to speak.

My own experience with the species in question began about the "turn of the century," when I used to see it frequently in wet meadows in central Massachusetts, and a few years later in one or two similar places on Long Island. In such places its associates were practically all supposed native species, though there is some reason to believe that the meadows themselves, or some of them, occupy sites from which swampy forests were cleared away by the early settlers.[1]

I never encountered it anywhere in the South until I came across a patch covering several square yards in a marshy place near some negro houses near the Warrior River in Tuscaloosa, Alabama, on June 1, 1928. But as it grows in dense colonies in wet places, and has leaves similar in size and shape to those of several species of *Iris* (though a little greener than most Irises),

[1] See Torreya, **16**: 269–270 (footnote). Jan. 1917.

it could easily be mistaken for an *Iris* at a little distance, especially at seasons when the latter is not in bloom. And I may thus have overlooked it in all my car-window botanizing (which has extended into or through about one-third of the counties in the United States and a few in Canada).

It happens that not long after I found it in Tuscaloosa one of the Birmingham papers started a series of daily articles (anonymous) on Alabama plants; and the very first one, on September 10, 1928, dealt with "Calamus, or sweet flag, as it is commonly called by natives of Alabama, where it is found growing abundantly in the swampy sections of the state." The article consisted mostly of folk-lore relating to the plant, beginning with the Bible, and referring to India, and some early customs of American Indians.[2]

As soon as possible I wrote a letter to the paper, challenging the statement about the abundance of calamus in Alabama, and asking if any readers knew of localities for it. That brought a few prompt replies (one from a correspondent about 75 miles away reaching me the same day my letter was published), the gist of which was that each writer knew of the occurrence of the plant long ago in one or two localities. It should be mentioned here that in a copy of Darby's Botany that belonged to Dr. Eugene A. Smith there is a marginal annotation for *Acorus Calamus*, "Ala.," which evidently means that he had seen it somewhere in the state in the 70's, possibly in Tuscaloosa, where I did many years later.

I left Alabama a few days after the inquiry just mentioned, and did not return to the state to work for three years, or do much botanizing again until 1933. After that I located a few more stations for *Acorus*. On May 17, 1934, I saw a small patch of it, in bloom, in the western edge of Athens, Limestone County, close to buildings and in pretty weedy surroundings, as in Tuscaloosa six years before. On April 16, 1935, I collected it in a marshy pasture about ½ mile west of Stevenson, Jackson County. A man who came along at that time to see what I was up to suggested that the plants may have washed down from

[2] In a History of Agriculture in the State of New York, U. P. Hedrick, 1933, Sweet flag—Acorus Calamus—is given in the list of Indian food and industrial plants in the section "Native plants, used but apparently not cultivated." (Editor.)

some negro houses which were plainly visible across the railroad. A letter received quite recently from Mrs. Lillian V. Porter, an amateur botanist of Chattanooga, Tenn., whom I had told about this find, states that she had a cook who came from a negro settlement a few miles from Stevenson, and said the people there cultivated the calamus ("calomel root," as they called it), and used it medicinally. A few plants that I saw along a partly shaded small stream in the western edge of Hamilton, Alabama, on June 2, 1936, were said to have been planted there by negroes.

During a visit to Atlanta at the end of October, 1936, while most of this article was in the hands of the editor or printers, I picked up an interesting bit of evidence. A friend who helped me verify the "Uncle Remus" reference (dimly remembered after more than forty years) in his collection of Georgia books, asked his negro cook if she knew anything about calamus. She replied that she had some of it growing in a box on her back porch; and she brought a leaf the next morning for verification.

When once established the plant seems to propagate indefinitely by rootstocks, and that doubtless explains why it seldom fruits, as noted by Britton and Brown. The same tendency is exhibited by numerous other plants.

As for its distribution in states adjacent to Alabama, Gattinger's observations in Tennessee have already been quoted. I have been in every county in Georgia but one, without ever seeing it there, but could have overlooked it, as previously suggested. The author of "Uncle Remus," who seems to have been familiar with the plant, lived in Georgia all his life, and may have known of one or more localities for it, wild or cultivated. Wood and McCarthy listed it in their Wilmington (N. C.) flora, 1887, but without comment.

Chapman's report of it from Florida may have been authentic, though he did not specify any locality, and it does not seem to have been confirmed by any recent observations. Dr. E. N. Lowe, in his Plants of Mississippi (Miss. Geol. Surv. Bull. 17. 1921), says of it: "In ponds, South Mississippi (Wailes). Lafayette Co."

It would be interesting to have testimony from others who may have seen acorus anywhere in the United States where it appears to be indigenous, or who have reliable records of its

intentional or unintentional introduction, with approximate dates. Some detailed notes on its distribution and habitat in the Old World, and on the other species which is said to grow in Japan, would also be valuable. If our plant grows in India it may also in Africa, and the ancestors of our negroes may have become acquainted with it there.

Most introduced and cultivated plants prefer comparatively dry soils, that have been or could be tilled; but there are a few other plants indigenous to Europe whose American habitat is similar to that of *Acorus*, and which may have had a similar history. The well-known mints, *Mentha piperita* and *M. spicata*, grow spontaneously in marshy places in all or nearly all the eastern states, but are said to have been introduced from Europe. Like the calamus, they are cultivated in some places for their aromatic properties.

The water-cress, called at various times *Nasturtium officinale*, *Roripa Nasturtium*, and *Sisymbrium Nasturtium-aquaticum*, appears perfectly at home in many of our limestone springs and the streams issuing from them, but is said to be of Old World origin. Like the mints, it is a commercial crop in some places.

Of similar habitat to the *Acorus*, but with more restricted range, and no known economic properties, is *Lythrum Salicaria*, a showy plant of wet meadows in some of the northeastern states and Canada, appearing like a native, but believed to have been naturalized from Europe.

University, Ala.

BOOK REVIEW

A new revision of a popular manual of trees[1]

The fourth edition of Schaffner's Field Manual of Trees is but little changed from the third edition. The first edition appeared in 1914. The book contains keys to trees in summer, based on the leaves with some use of bud, twig and pith characters; in winter, based on twig and bud characters; and to flowers and "other characters present at the time of flowering." This last key will probably be used infrequently, as the others serve the purpose of determining the trees admirably. In the appendix is a brief key to woods. The descriptions of genera and species are concise and complete enough for the purpose for which the book is intended.

The arrangement of the families and genera follows the Besseyan system as modified by Schaffner. Thus the trees fall in three phyla, the Cycadophyta including only the ginkgo, the Strobilophyta, with the remaining gymnosperms, and the Anthophyta, with all the rest of the trees. Under the last phylum the subclass Amentiferae with the orders Platanales, Urticales, Fagales and Salicales instead of following the conifers, as in the classification used in our common manuals, follows the Sapindales, the order to which the maples belong and is followed by the orders including the dogwoods and viburnums at the end of the series. This arrangement, it is stated in the preface, "will enable one to acquire some idea of the evolution of the higher plants . . . and will also indicate the direction of the general evolutionary movements," which seems to indicate a strictly linear development.

The names used have been changed in a few cases from those in the third edition and in both editions the names are often at variance with those commonly in use. *Quercus rubra* is now *Q. maxima*, while *Q. triloba* of the earlier edition becomes *Q. rubra*. In this case the former names are given as synonyms, but in only one or two other cases are synonyms given. The black cherry, commonly known as *Prunus serotina*, is *P. vir-*

[1] Field Manual of Trees. John H. Schaffner. R. G. Adams and Co. 160 pages. $1.50.

giniana, and the choke cherry commonly known as *P. virginiana*, is *P. nana*. For each species only one common name is given, though a few others are found in the index. Choosing from the many common names in use is difficult and the names adopted will not satisfy those who have been using others. Those who have been endeavoring to have Gray Birch used for *Betula populifolia* will not be satisfied with American White Birch. And it seems too bad not to use Basswood and Mountain Laurel but to substitute American Linden and Mountain Kalmia. Also it is not to be expected that "common" names will every be commonly used for the 52 species of Crataegus. Those who can distinguish the species will find the scientific names easier than Martha's Vineyard Hawthorn, Marshall's Hawthorn, Caughuawga Hawthorn and so on through the list. In fact the common names are given here apparently for consistency, as at the beginning of the genus it is noted that "many of the specific English names are also unsatisfactory."

A few errors are due to the printer; **Cotinus Adans.** instead of **Cotinus** Adans., *Populus grandidentaea*, instead of *P. grandidentata*, **Hamamelis** instead of *Hamamelidaceae* for the family name, and a few other comparatively unimportant mistakes that will confuse no one.

But mistakes are few and the matter of classification is only an incidental thing in the book. Its main purpose is to furnish a simple way of becoming familiar with the trees one meets. This the book does very satisfactorily. The book can be used easily by boy and girl scouts and other young people interested in the out-of-doors but is also suitable for students taking courses on trees in college. All the trees native to the northeastern United States and Southern Canada as well as the more common introduced trees are included.

The book is attractively bound in red cloth, of a size to fit easily into a coat pocket or handbag and should prove a most valuable companion for those who wish to become familiar with the trees of the roadside and woods.

George T. Hastings

FIELD TRIPS OF THE CLUB

Trip of June 20–21 to Hanging Hills, Meriden, Conn.

Meriden Mountain, the highest point of the range called the Hanging Hills, with an altitude of 1,007 feet, the highest trap dike in the State of Connecticut, was the principal objective of the week end trip of June 20–21. The geology of the region was explained, from this viewpoint, by Mr Lougee, of the Department of Geology, Columbia University, who has been making a study of the region. He said that the Hanging Hills are part of a basalt sill injected into the Triassic formations of eastern North America. A series of cross faults in this rock allowed greater weathering in such faults where the rock was crushed, and the Hanging Hills are the remaining harder portions.

The party spent the night in the home of the writer's father, built in 1766, and the first Congregationalist parsonage in the Town of Southington. Nearby is a rounded hill, a beautiful example of a kame, or water laid deposit of glacial debris, near the edge of the continental ice sheet of the Ice Age.

In a nearby pond, several amphibians were collected, including the somewhat rare Spadefoot toad *Scaphiopus Holbrookii.*

A local botanist, Mr Howard Whitney, joined the party and was very helpful in identifying the flora. About 125 species were checked, some of the most noteworthy being:

Menispernum, Moonseed; *Caulophyllum thalictroides*, Blue Cohosh; *Corydalis glauca; Polygala polygama; Geum album; Fragaria vesca*, Wood Strawberry; *Cornus circinata*, Round Leaved Dogwood; *Sambucus racemosa*, Red Berried Elder; *Campanula rotundifolia*, Harebell; *Arctostaphyllos uva-ursi*, Bearberry, growing in large mats on the summit of Meriden Mountain; *Gentiana crinita*, Fringed Gentian; *Lilium philadelphicum*, Wood Lily.

Photographs were made of lichens, including a beautiful colony of *Stereocaulon paschale*, with both the normal and the dense form, *conglomeratum*, on a shelf on the top of the cliffs on the west side of the mountain, also of the orchids, *Calopogon pulchellus*, Grass Pink and *Pogonia ophioglossoides*, Snake's Mouth.

Louis W. Anderson

Trip of July 12 to Surebridge Swamp, Interstate Park

Surebridge Swamp, a high, cold, forested swamp, at an altitude of about 1,000 feet, in the western part of the Harriman Section of the Palisades Interstate Park, was visited on July 12. A new station was found in the depths of the swamp, unusually penetrable owing to dry weather, for the Virginia Chain fern, *Woodwardia virginica*. The red fruited sorediate lichen, *Cladonia incrassata*, not common in the Hudson Highlands, was rather extensive here about bases of red maple trees. On the "Lichen Trail," climbing the ledges of Hogencamp Mountain, the only really ample station in the Hudson Highlands, of the Iceland Moss lichen, *Cetraria islandica*, was noted, other lichens on the glaciated ledges and boulders lying on them were *Stereocaulon paschale*, *Rinodina oreina*, and *Lecanoras*. *Cladonia rangiferina*, the Reindeer Moss, *C. sylvatica*, *C. chlorophaea*, and *C. strepsilis* occur along the edges of the open ledges.

A sally off the trails into a gully leading off the west side of Hogencamp Mountain, disclosed some very clear slickensides, another evidence of the great over-thrusting which occurred on the west side of the Highlands of the Hudson in the Taconic Revolution. Swamps traversed on the way out to the Crooked Road past Island Pond, disclosed many robust mosses, especially large *Mniums*, and the hepatic, *Bazzania trilobata*, was common.

Raymond H. Torrey

Trip of August 9 to Gardiner's Island

The train and boat trip to Gardiner's Island, at the east end of Long Island, one of the most interesting events of the field schedule, turned out this year to be a veritable armada, with two boats required to carry the 48 members and guests from other groups. The trip was made possible by the kindness of Mr. Clarence H. MacKay, lessee of the island.

When the boats landed, after the eight mile sail across Gardiner's Bay, the party broke up into groups interested in plants, birds, or geology. All saw the old Gardiner burying ground, with stones dating from the middle of the seventeenth century, all but the very newest decorated with young to very ancient colonies of the lichen, *Rinodina oreina*, derived, evidently, from a red granite boulder transported from somewhere

in New England by the ice sheets, and covered almost completely with this lichen.

The botanical party, some of the members of which had examined the north side of the Island last year, tried the south side this time. They followed the woods along the west side of Tobacco Lot Pond, rousing the angry cries of ospreys nesting in the trees. A blooming plant of *Habenaria psycodes* was an interesting find. A planted area of Catalpa has done well with the trees uniformly large and well grown. Toward the south end, the moraine hills are open, with short grass, and a good deal of the Golden Aster, *Chrysopsis*. The shallow borders of Tobacco Lot Pond contain some extraordinarily tall Cat-tails, *Typha latifolia*. The ospreys for which the island is famous, were more numerous than ever, nesting everywhere in trees, and on boulders along the shores or in the water. One member offered an observation which was new to this writer, that ospreys were early discoverers of the principle of stream-lining, now the rage in automobiles and railroad trains. He asked us to note then when an osprey dived, caught a fish and rose to carry it to its nest, it always held the fish head first, so that it would give the least resistance. And so they did.

One really does not have time to do justice to the flora of Gardiner's Island, in the five hours we had ashore. The woody, swampy areas are probably rich in slime moulds, for one thing, as Robert Hagelstein found in his first visit there last year. The general flora is about like that of eastern Long Island. The oaks, maples and sourgums in the woods on the south end of the island, are fine specimens, but not quite as large and impressive as those at the north end, which we saw last year. To get the most out of a short visit, the north side, with the big oaks, and the colored clay cliffs, is most interesting, and the terminal sand spit at the northern extremity, with its scattered red cedars, looks worth intensive study on another expedition.

Raymond H. Torrey

Catskills Trip, September 12–14

About a dozen members of the club greatly enjoyed the week end trip under the direction of Mrs. Inez Haring, of Woodland, Ulster County, Sept. 12–14 in the southeastern Catskills.

A novelty was the trail over Giant Ledge and Panther Mountain, only recently finished by the State Conservation Department, with C.C.C. labor, affording interesting plants of the balsam fir–spruce forest association above 3200 feet, and wide views in every direction.

On Saturday the party motored to Watson's Hollow, west of the Ashokan Reservoir, and, although caught in a shower, found many flowering plants, ferns and mosses. An unusual moss found by Mrs. Haring was *Anomodon apiculatus*. On Sunday, the enlarged party climbed the yellow-blazed state trail from the camp ground at the head of Woodland Creek, up to the new trail, which was followed north to Giant Ledge. Views of the old slide, of 1820, with three new slides, made in the flood of 1933, on the north face of Slide Mountain, 4204 feet, highest of the Catskills, were clearly seen from the southern ledges. The new trail passes along the brink of the 200-foot cliff on the east side of Giant Ledge, for half a mile. It then descends into a notch and climbs about 800 feet to the highest summit of Panther Mountain, at 3750 feet.

On these mountain tops are many vertical ledges, bearing large, dense colonies of the Rock Tripe Lichen, *Umbilicaria Muhlenbergii*, of extraordinarily large size, specimens a foot in widest diameter being common and the largest measuring fourteen inches. Heavily fruiting specimens of the Mountain Ash, *Pyrus americana*, made a brilliant display with their bright red berries. Several asters and goldenrods made up the greater part of the flowering plants. Fleshy fungi, including fine specimens of *Hydnum caput-ursi*, were numerous after a wet spell. *Parmelia Cladonia*, the lacy tree lichen first reported in the club range on Panther Mountain, thirty years ago, by Mrs. Carolyn Harris, was common on dead and on some living firs and spruces, and it is now known to occur on most high Catskill summits. The most common *Cladoniae* were *gracilis*, *squamosa*, and *coniocreae*, although on the northernmost high summit of Panther, an open ledge bore colonies of *C. rangiferina*. *Cetraria atlantica*, *pinastri* and *oakesiana* were noted.

Some of the party followed the new trail all the way through to Fox Hollow and State Route 28, in the Esopus Valley. This would make an interesting trip in late spring, when more flowering plants would be in bloom. In open pastures in Fox Hollow,

the Basil, *Satureja vulgaris*, a characteristic late summer plant of such situations in the Catskills was very common.

FARIDA WILEY

CAPE MAY COUNTY NEW JERSEY, OCTOBER 3–4

The week end trip in Cape May County, N.J., returning through the Pine Barrens with stops at various points, on Oct. 3 and 4 proved unusually interesting. We were fortunate in having as a guide Mr. Otway H. Brown, of Cape May, a local expert on the flora, particularly so on the grasses, sedges and rushes, which were numerous. Dr. J. M. Small, Assistant Professor of Botany at the New Jersey College for Women, who was in the party, with Mrs. Small and three of his students, and who is thoroughly acquainted with the South Jersey flora and with stations for rarer species, also made the trip highly instructive.

To the writer, the high light of the trip was the finding of an ample and secure station for *Cladonia leporina*, a beautiful branching member of this genus, resembling *C. Boryi* or some of the sub-genus *Cladina* in its densely branching structure, but with *scarlet* apothecia. This station was probably known to the late Dr. J. H. Eckfeldt, of the Philadelphia Academy of Sciences and Philadelphia Botanical Club, who collected in Cape May County, 40 years ago, with Mr. Brown, who recalled Dr. Eckfeldt's finding of many lichens. But as no specimen was deposited in any herbarium, when Dr. Alexander W. Evans, of Yale University, leading American worker on *Cladoniae*, compiled his paper on "The Cladoniae of New Jersey," which appeared in the July–Aug. 1935 issue of Torreya, he listed the record of *C. leporina* as inconclusive, in the absence of available material, although he suggested it might be expected in New Jersey.

George F. Dillman, a member of the Torrey Botanical Club, found this station, which is in the Witmer Stone Bird Sanctuary, at Cape May Point, on Sept. 6, and sent me a box of it, not knowing it but suspecting it to be unusual. I recognized it, from material I had received from Arkansas and North Carolina, determined by Dr. Evans, and sent it to him. He was much pleased to have it definitely restored to the Cladoniae of New Jersey.

The station is on the west side of a swamp, north of the railroad tracks which run to a sand sorting plant on the edge of Delaware Bay, at Cape May Point. It covers several acres, one open area of about two acres of sandy soil being almost exclusively carpeted by it, and other colonies are scattered in the sandy woods nearby. It may be the most northern station for this Cladonia, which is recorded mostly from farther south by Tuckerman.

Two other Cladoniae of southern range, according to published records, but which have been found in recent years, in South Jersey, were also found by the writer on this trip. Another station for *Cladonia santensis*, found for the first time in New Jersey in Ocean County, in 1934, and since then in Atlantic, Cumberland and Cape May Counties, was discovered at Quaker Bridge, on Batsto River, south east of Atsion, Burlington County. An ample station for *Cladonia floridana*, until recent years not reported north of Maryland, but now known from New Jersey and Long Island, was found at Hampton Gate, Burlington County.

Among flowering plants, notable species were the great Pine Barren Gentian, *Gentiana Porphyrio*, which Dr. Small showed us near Atsion station on the Central Railroad of New Jersey, and *Lygodium palmatum*, the Climbing Fern, in ample quantity along at Hampton Gate.

At Cumberland Furnace, in Cape May County, a plant new to us was *Opuntia Rafinesquii*, differing from *O. vulgaris*, of northern New Jersey, Hudson Valley and Long Island stations, in bearing, besides the clusters of small bristles, stout, longer ones, up to an inch and a half in length, on the tips of the fleshy stem sections. *Polygala lutea*, the Orange Milkwort, still in bloom, in places where it had been mowed and sprung up again, was strikingly attractive. *Proserpinaca pectinata*, in ditches near Atsion, was another novelty to some of us. It occurred with the strikingly three ranked sedge, *Dulichium arundinaceum*. A handsome grass named for us by Mr. Brown was *Glyceria obtusa*. The sedge *Scirpus Eriophorum*, with its seeding heads rusty brown, was common in wet spots. Persimmon trees were heavy with fruit in the wet woods back of Town Bank, north of Cape May Point. This dune strip, covered with red cedars, is an interesting spot. *Polygonella articulata* was in full

bloom, along beaches, in dry fields, and along railroad tracks, a dainty plant, the flowers very pretty under a hand lens.

RAYMOND H. TORREY

PROCEEDINGS OF THE CLUB

MEETING OF APRIL 15, 1936

The meeting was called to order at 3:30 P.M. at the New York Botanical Garden, by the president. Forty-eight members were present. The minutes of the meetings of March 18 and April 7 were read and adopted.

The secretary presented a letter from the Smithsonian Institution, Washington, D. C., with regard to some of the Club's publications which had been sent them for use in preparing the International Catalogue of Scientific Literature, and it was moved by Dr. Barnhart and seconded by Professor Hazen that the secretary request the return of such publications so soon as possible.

Another letter from the Ecological Society of America was read by the secretary, calling the attention of the Club to a rider on the Department of Interior bill calling for an irrigation tunnel under Rocky Mountain National Park and the consequences of such a tunnel on the water supply of that region. It was moved, seconded, and unanimously passed that the secretary find out whether the bill had already been passed, and if not to communicate to our congressman the Club's disapproval of such a project.

The president brought up the question of disposing of our surplus index cards at a reduced rate to various institutions which had applied for them. The question was discussed pro and con for some time and finally referred to a meeting of the Council.

The secretary, in relation to the letter from the Smithsonian Institution, raised the question as to a change in our committee on exchanges and the appointment of an additional member who is more active in the affairs of the Club. This matter was also referred to the coming meeting of the Council.

The scientific part of the meeting consisted of two addresses —one by Professor E. W. Sinnott, of Barnard College, Columbia University, on "A Developmental Analysis of Four

Types of Shape Determinations in *Cucurbita* Fruits," and the other by Dr. Roger P. Wodehouse, of the Arlington Chemical Company, on "Pollen Grains of the Ranunculaceae and Alismataceae." Both of these papers stimulated considerable interest and discussion.

The meeting was adjourned at 5:00 P.M.

J. S. KARLING, *Secretary*

MEETING OF MAY 5, 1936

The meeting was called to order at the Museum of Natural History at 8:25 P.M. by Second Vice-President F. E. Denny, with 69 members and visitors present. Mr. H. Harold Hume, Florida Agricultural Experiment Station, Gainesville, Florida, was unanimously elected to membership, and Mr. H. B. Fleischer was elected a field member.

The scientific program consisted of an exceptionally well illustrated lecture by Dr. M. A. Howe, Director of the New York Botanical Garden, on "Diatoms: Microscopic Beauties," and a film showing diatoms in motion and the acquiring of diatomaceous earth in California was exhibited by the Johns Manville Company.

J. S. KARLING, *Secretary*

MEETING OF MAY 20, 1936

The meeting was called to order at 3:30 P.M. at the New York Botanical Garden, the president presiding and forty-five members present. The minutes of the meetings of April 15 and May 5 were read and adopted.

The scientific part of the program consisted of two addresses: one by Capt. B. Kingdon Ward, eminent horticulturalist and explorer of plants, on the "Flora of Tibet," and the other by Dr. Michael Levine on the "Production of Cancer on Plants by Chemical Agents." Both of these addresses were well illustrated by lantern slides and stimulated a great deal of interest and discussion.

The meeting was adjourned at 5:00 P.M.

J. S. KARLING, *Secretary*

NEWS NOTES

The Massachusetts Horticultural Society has awarded its gold medal to Mr. Norman Taylor who was editor of Torreya for ten years previous to 1921. The citation accompanying the award reads "For your work in editing the Garden Dictionary, considered the most notable Horticultural book which has appeared in America in recent years."

The Joshua Tree National Monument has recently been created in San Bernardino and Riverside Counties of California. The monument includes over 800,000 acres of desert land over much of which the peculiar yuccas known as Joshua Trees grow. The range of the Joshua Tree extends north from the new monument into the Mohave Desert and east into parts of Nevada, Arizona and Utah. The monument is to preserve primitive desert life of all kinds.

Republication of Sargent's Plantae Wilsonianae. This most important publication on the flora of China, issued by the Arnold Arboretum in 1911–1916, has been out of print for several years. A facsimile reprint is now being prepared by the off-set process by the Tri-Union Book Company of Peiping. The three volumes, $15 for the set, may be ordered through the Arnold Arboretum, Jamaica Plain, Mass.

Dr. R. B. Harvey, director of the Florida Citrus Research Laboratory, has been elected president of the American Society of Plant Physiologists for the coming year and Dr. O. F. Curtis of Cornell University, has been elected vice-president.

Dr. Harry Briton-Jones, dean of the Imperial College of Tropical Agriculture and professor of mycology and bacteriology died in Port of Spain, Trinidad on November 7 following an operation. He was forty-three years old.

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TORREYA

A Bi-Monthly Journal of Botanical Notes and News

John Torrey 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

GEORGE T. HASTINGS

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GARDEN

TORREYA

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Common names of common plants: Plant lore from the dictionary

George T. Hastings

Many, or most, of the common names of our plants came from Europe, either with the plants,—as the daisy, dandelion, and hundreds of others brought in purposely or accidentally—or given to native plants related to or resembling Old World ones.[1] Thus our Witch Hazel, *Hamamelis virginiana*, is unrelated to European plants of the same name, one an elm, *Ulmus montana*, another a hornbeam, *Carpinus*. The name is from an Old English word, *wice* or *wic*, meaning weak; the pliant twigs of the elm were used in making bows, those of the hornbeam for divining rods. Possibly because the name has been changed to witch, magical properties have been assigned to the plant. In "Travels Throughout the Interior Parts of North America," written in 1778, supposedly by Jonathan Carver, it is stated that "The Witch Hazel . . . is possessed of the power of attracting gold and silver, and twigs of it are made use of to discover where the veins of these metals lie hid." Hemlock is an old Anglo-Saxon name for several poisonous umbelliferous plants, especially *Cicutum* and *Conium*, and given to our tree, *Tsuga*, because of a slight resemblance of the leafy twigs to the leaves of the poison hemlock, *Conium*. Mandrake is another name applied to unrelated plants on opposite sides of the Atlantic. In Mediterranean regions it is *Mandragora officinalis* of the nightshade family, here it is the May Apple, *Podophyllum pelta-*

FEB 24 1937

[1] Most of the derivations of the names given here are from Webster's International Dictionary, others are from Murray's New English Dictionary. In the *American Botanist* Willard Clute has been publishing articles on Plant Names and their Meanings since 1919, describing chiefly scientific names, but occasionally the common names as well.

tum of the barberry family. The English name means man-like, from a fancied resemblance of the forked roots of the European plant to a human body. An ancient belief was that the plant had animal life and would cry out when pulled from the ground. Arbutus, from the Latin *arbor*, a tree, is the name of a European tree of the heath family to which our trailing arbutus, *Epigaea repens*, has a slight resemblance in its leaves.

Few of our native plants have really native names. Cohosh was the Indian name for the baneberries, *Actaea;* black snakeroot, *Cimicifuga;* and blue cohosh, *Caulophyllum. Hickory* is the Indian name for a distinctly American genus of trees; it was originally pohickory. Tamarack and hackmatack are Indian names for the larches, *Larix*, of both eastern and western America. The only other tree for which we use an Indian name is the Osage orange, named for—not by—the Osage Indians in whose part of the country it grew. Kinnikinnick, used for our *Cornus Amomum*, is an Indian name meaning a mixture. It was used for a number of barks, and so for the plants they came from—smoked either alone or mixed with tobacco by the Indians. A few other Indian names will be referred to later.

Some plant names explain themselves as descriptive of the plant, its time of flowering or fruiting, or its uses. Such are coral root, corpse plant, dangleberry, Dutchman's breeches, everlasting, June berry, morning glory, evening primrose, spring beauty, and scores of others.

Other plants are named for heavenly bodies as the sunflower, the scientific name, *Helianthus*, from the Greek *Helios*, the sun; sundrops; heliotrope (*helios*, the sun and *trope*, a turning), because the plant turns to face the sun, as does the sunflower. Heliotrope was used by the Greeks for some plant different from our cultivated one which is a native of Peru and of course unknown to the ancients. But in Gray's Manual the name is said to have been given because the plant flowered at the summer solstice when the sun turns from its northern journey to the south. Moonwort (wort is Old English for root or plant) is another name for the cultivated honesty or *Lunaria* (*luna*, the moon), the silvery septum of the fruit, often used in winter bouquets, being like the full moon. Moon fern, for the Botrychiums, especially *B. Lunaria*, because of the crescent-shaped lobes of the frond. There are numerous star flowers, as

Trientalis americana; the star grass, *Hypoxis;* star of Bethlehem, *Ornithogalum umbellatum;* starwort or common chickweed, *Stellaria* (*stella*, a star); and the asters (*aster*, a star) also called starwort.

Other plants are named for animals, sometimes because of some fancied resemblance, or because eaten by the animal, but in many cases the reason for the name is lost in the distant past. All of our domestic animals have plants bearing their names. Catnip (nip from an old Dutch word *nippen*, to sip, in English becoming a drink of some intoxicant), cowbane, cow wheat, dogbane, dog berry, horse tail, horse radish, colt's foot, lamb's quarters (possibly because the plant was eaten with lamb), sheep sorrel, pigweed, hog peanut, and others. Names of wild animals are also used;—bear berry, buffalo berry, buffalo grass, deer berry, foxglove, monkey flower, moosewood, squirrel corn, wolf's bane, and others. Birds' names appear in crowfoot, goosefoot, partridge berry, pigeon berry, duckweed and hawkweed. Other animal names are found in frog bit, frog spit (for floating masses of filamentous green algae), toad flax, eel grass, pickerel weed, snake root, turtle head.

In the early days when it was taken for granted that the earth and everything in it was created solely for the use of man, if a plant was not useful for food, fiber or beauty, its virtues were considered probably to be for the cure of disease.

> Excellent herbs had our fathers of old—
> Excellent herbs to ease their pain—
> Alexanders and Marigold,
> Eyebright, Orris and Elecampane.
> . . . . . .
> Anything green that grew out of the mould
> Was an excellent herb to our fathers of old.
>
> *Our Fathers of Old*, Rudyard Kipling

So we have plants bearing the names of the parts of the body they were supposed to help; blood root, boneset, heart's ease, kidneywort, liverwort, lungwort, spleenwort.

Of course there are many names for which we cannot find the meanings, "Many of our plant names were hoary with age before upstart technical names were invented. In the course of time, inattentive ears and careless tongues have obscured the

original sound of many, . . . ignorance is responsible for a number of curious errors and for the bestowal of plant names on species to which they do not belong and other changes have occurred until the task of discovering the original meaning is far from easy, and in some cases quite impossible."[2]

In our floras and manuals there are often found "common" names that never have been, and possibly never will be, used commonly. These are often literal translations of the scientific names. When the specific name is derived from the name of a person or a region the resulting "common" name is often too clumsy for use.

A few of many names interesting because of their connection or derivation are listed alphabetically.

ADDERS TONGUE, the fern *Ophioglossum* (Greek meaning serpent's tongue), also the dog-tooth violet, *Erythronium*, supposedly from the tongue-shaped leaf. The name dog-tooth may refer to the recurved, sharp pointed perianth parts of the flower.

ALFALFA, from the Spanish, derived from the Arabic *al-facfacah*, the best feed.

ALSIKE CLOVER, from Alsike, near Upsala in Sweden, mentioned by Linnaeus as a habitat of the plant.

AMARANTH, from a Greek word meaning unfading, because the dry calyx and bracts do not wither in drying.

ANEMONE, from the Greek, meaning daughter of the wind, because the flowers were supposed to open in the wind. This is the derivation given in the dictionaries, but in Gray's Manual the name is said to be a corruption of Náman, the Semitic name for Adonis, from whose blood the crimson-flowered anemone of the Orient was said to have sprung.

AZALEA, from the Greek, dry, because the plant will grow in dry places.

BACHELOR'S BUTTON, several species of buttercup, *Ranunculus*, with double flowers, the corn flower, *Centaurea*, and the globe amaranth, *Gomphrena*. The name given "for their similitude to the jagged cloathe buttons anciently worn in this kingdom, according to Johnson's Gerarde; but to other writers ascribed to a habit of country fellows to carry them in their pockets to divine their success with their sweethearts." Dr. Pryor.

[2] Willard N. Clute, Common Names of Plants, 1931.

BANE, an Old English word meaning destruction and applied to any supposedly poisonous plant, as baneberry, bugbane, cowbane, henbane, fleabane, etc.

BEARBERRY, because the bears are fond of the fruit. The generic name *Arctostaphylos* is a translation of the common name into Greek.

BEECH, Norse and Old German *böke*, *bōke*, Old English *boc*, the name of the tree in these languages. Our word book comes from these words as in ancient Saxony and Germany runes were written on thin slabs of beech wood and these made the earliest books in those lands.

BEDSTRAW, *Galium verum* was long known as Our Lady's Bedstraw. This and other species were dried and used to fill mattresses. A legend arose that the hay in the manger of Bethlehem turned into this plant with its mass of dainty flowers.

BONESET, *Eupatorium perfoliatum*, received its name because it was used as a remedy for malaria or break-bone fever. It is also called thoroughwort because the stem apparently goes through the perfoliate leaves.

BONEWORT, a name given to a number of plants because of supposed bone-healing properties. Among these plants are the ox-eye daisy, golden-rod (the Latin *Solidago* means to join or make whole), centaury, and the royal osmunda.

BUCKBEAN, *Menyanthes trifoliata*, probably a corruption of bogbean.

BUCKEYE, *Aesculus* species, because the dark brown seed resembles a deer's eye. Also called HORSECHESTNUT, probably because of the coarse nuts unfit for food,—the word horse is frequently used in this sense as in horseradish, but Webster says the nuts are said formerly to have been ground and fed to horses, while Murray quotes Gerard's Herbal, "for the people of the east countries do with the fruits thereof cure their horses of the cough . . . and such diseases."

BUCKWHEAT, from the Old English, *boc*, the beech tree, the triangular seeds resembling miniature beech nuts.

BUGBANE, *Cimicifuga*, Old English *bugge*, a hobgoblin and *bane*, to destroy. A charm made from the plant was used to drive away hobgoblins.

BUTTERCUP, *Ranunculus*, also called butterflower and golden cups, the cuckoobud of Shakespeare. In earlier writings always

written buttercups, possibly because of an idea that the yellow color of butter was due to cows eating the flowers.

CAMOMILE or CHAMOMILE, Greek *chamai melon*, earth apple, from the smell of the flower. The Latin name of the apple, *Malus*, is from the Greek *melon*.

CENTAURY, *Centaurium* species, (already mentioned under bonewort) is an old name applied by the herbalists to several plants, from *centum*, hundred and *aurum*, gold-piece, because of their supposed priceless medicinal values.

CHESTNUT, Greek *castana*, a city of Pontus, where the trees grew abundantly and whence they were introduced into Europe. Castanets were so called because they were shaped like chestnuts, or possibly pairs of chestnuts were used at first to make the clicking sound.

CLEMATIS, from the Greek *clema*, a tendril or twig. The name was used by Dioscorides for some plant with long slender branches.

COLUMBINE, from the Latin *columba*, a dove, perhaps from the spurs or nectaries being beak-like, or like doves' heads. The scientific name *Aquilegia* probably comes from *aquila*, eagle, from a resemblance of the nectaries to talons. But Drewitt[3] says it is derived from *aquilegus* (*aqua*, water plus *lego*, carry) and suggests that the spurs represent "five pigeons perched around something out of which they are drinking."

COWBANE, COW PARSLEY, COW PARSNIP, all poisonous umbelliferous plants. Probably the name comes from the verb *cow*, to cause fear, but it may possibly be because the plants poison cows that eat them.

CRANBERRY, because the berries ripen in spring when the cranes return, or, according to Murray, from the Gaelic *crann*, a measure of capacity for fresh herrings. The name seems to have been used by the American colonists and brought to Engglland with the berries (*Vaccinium macrocarpon*) imported as early as 1686.

DANDELION, French *dent-de-lion*, lion's tooth from the ragged teeth or lobes of the leaves.

DAISY, Old English *dayesye*, the day's eye, open in the day. The English daisy is *Bellis perennis*, our common daisy is the English ox-eye daisy.

[3] F. D. Drewitt, Latin Names of Common Plants, 1927.

DOGWOOD, originally *dagwood*, as dags or skewers made from it were used in roasting meat, from an old Celtic word *dag* related to dagger. It was adapted for this purpose because the hard wood did not burn easily nor give taste to the meat. But Murray says the name was given because the berries, unfit for human food, were fit only for dogs.

FESCUE GRASS, Latin *festuca*, a straw. A straw or stick used chiefly to point out letters to children learning to read.

GENTIAN, from an Illyrian king, Gentius, defeated by the Romans about 160 B.C., who was said to have discovered the tonic properties of the plant.

GERANIUM, Greek *geranos*, a crane, from the fruit like a crane's head and bill, so also called crane's bill. When L'Heritier de Brutelle divided the Linnean genus he put the cultivated geranium into the genus *Pelargonium*, Greek *pelargos*, a stork, and for the plant sometimes called stork's bill he made the genus *Erodium*, Greek *erodios*, a heron.

GILL-OVER-THE-GROUND or ground ivy, *Nepeta Hederacea*, the first part of the name from Old English Gillian, feminine of Julian. Gill came to mean a sweetheart or a flirt. Spelled Jill we have it in the nursery rhyme, Jack and Jill.

GINSENG, a Chinese word *jin-tsang*, likeness of a man. The forked root was supposed to resemble a man's body. The Chinese believe it to have extraordinary powers of curing exhaustion of body and mind.

GOOSEBERRY, a corruption of the German *krausberre*, or crisp berry. But Murray says "The grounds on which plants of fruits have received names associating them with animals are so commonly inexplicable that the want of appropriateness in the meaning affords no ground for assuming that the word is an etymological corruption, e.g. of the German *krausberre*."

HACKBERRY, a variant of hagberry, Anglo-Saxon *haga*, a fence or coppice.

HAWKWEED, *Hieracium* species, so called from an ancient belief that birds of prey used the juices of the plants to strengthen their vision.

HEAL-ALL or SELF-HEAL, *Prunella vulgaris*, was supposed to be of value in healing wounds. It was also called carpenters' weed and used especially for treating cuts made by carpenters' tools.

HOLLY, *Ilex* species, the holy tree because used for decorating churches at Christmas.

HORNBEAM, horn + beam, the latter an Anglo-Saxon word for tree. So called because the wood is as hard as horn. Both of our hornbeams, *Carpinus* and *Ostrya*, are called *ironwood*, a name given to certain trees in many parts of the world.

JERUSALEM ARTICHOKE, *Helianthus tuberosus*, was cultivated by the Indians before the coming of the white man. It reached Europe early in the seventeenth century and for some reason was given the name Girasole artichoke. The Italian *girasole*, sunflower, has been corrupted to Jerusalem.

JIMSON WEED, *Datura Stramonium*, an Asiatic weed that became naturalized near Jamestown, Virginia, and was called Jamestown weed,—but James easily became Jim.

LABRADOR TEA, species of *Ledum* used for making tea in British Columbia and Labrador during the Revolutionary war, as was NEW JERSEY TEA, *Ceanothus americanus*, further south.

LOBELIA was named for Matthew Lobel or de l'Obel, a Flemish physician to James the First. He travelled through Europe in search of plants and wrote two books describing them.

LOOSESTRIFE, Greek *lysio*, release from and *mache*, strife. Pliny says that oxen made to eat it are rendered more willing to pull together.

LOUSEWORT, *Pedicularis* species, supposed to make sheep that feed on it lousy.

LUPINE, the Latin *lupus*, wolf, indicated the plant was supposed to rob the soil of nourishment. (Apparently the Romans had no idea of the value of leguminous plants to the soil.)

MAYFLOWER, the trailing arbutus, *Epigaea repens*. In Whittier's legend it was the first flower to greet the Pilgrims at Plymouth and was named by them for their ship.

MALLOW, Greek *malakos*, soft, either because it could be used to soften water or for the soft downy leaves.

MUSTARD, Latin *mustum*, the fresh juice of grapes. Mustard was formerly prepared by mixing it with must.

NASTURTIUM, Latin *nasus*, nose, + *torquere*, torture or twist. So the nasturtium is the nose twister because of its pungent taste and odor. The name properly belongs to the water cress and related plants of the mustard family. The garden nasturtium is a South American plant of the genus *Tropaeolum*.

OXALIS, Greek *oxus*, sour, as the leaves contain oxalic acid. The acid, incidentally, gets its name from the plant. The name SORREL applied to both *Oxalis* and *Rumex Acetosella* is from the French *sur*, sour.

PENNYROYAL, *Mentha Pulegium* in Europe, *Hedeoma pulegioides* in America. A corruption of the Old English *puliall royal*, derived from the Latin *pulex*, a flea (note too the specific names of the two species). The name means good against fleas.

PRIMROSE, Latin *primus*, first, the first flower of spring. Our evening primrose, blossoming in late summer, is certainly misnamed.

RASPBERRY, Old English *raspe*, a rasp or coarse file, from the prickly stem.

SAGE, Old English *sauge*, from the Latin *salvia* (the scientific as well as the original common name of the plant) from *salvus*, saved in allusion to its reputed healing qualities.

SAMPIRE, French, l'herbe de Saint Pierre. Any species of glasswort, *Salicornia*. GLASSWORT because *Salicornia* and *Salsola* were burned to obtain soda ash for glass making.

SOLOMON'S SEAL, the scars on the rootstocks left by the aerial stems of past years suggest the marks made in wax with a seal or signet.

SHADBUSH, flowers when the shad are running, or going up stream to spawn. Also called JUNEBERRY because the fruit ripens in June, and SERVICEBERRY from the Old English *serves*, berries. In Europe serviceberry is the name for several species of *Pyrus*, but in America the closely related *Amelanchier*.

SQUASH, a Massachusetts Indian name, *asq*, plural *asquash*, raw or green, applied to vegetables eaten before ripe.

TEASEL, Anglo-Saxon *taesan*, to pluck or tease, because one species, *Dipsacus fullorum*, with hooked bracts was used in teasing or raising the nap on woolen cloth.

NEW YORK CITY

A new station for Hemlock in Minnesota

E. I. Roe and P. O. Rudolf

A new location for eastern hemlock (*Tsuga canadensis* (L). Carr.) in Minnesota, probably representing the westernmost occurrence of this species in North America, was recently called to the writers' attention by officers[1] of the Division of Forestry of the State Conservation Department. The fourth station for this species definitely known to exist within the State at the present time, it consists of a group of three trees (Figures 1 and 2) about 400 feet south of State Highway Number 27 (from which they are plainly visible) in the northeast $\frac{1}{4}$ of the northeast $\frac{1}{4}$ of Section 14, Township 43 North, Range 25 West, Mille Lacs County.

The area was visited by the authors in early November, 1935 and the measurements taken which appear in the accompanying table. Total height was obtained by means of an Abney

Table 1

Tree No.	Diameter Breast High* Inches	Age at Breast Height* Years	Total Height Feet	Crown Class	Remarks
1	20.2	100 to rot, 4 inches from center	73	Dominant	Last 9 feet of top dead; general condition good
2	8.1	110	38	Suppressed by 1 and 3	Good
3	13.9	106 to rot; total probably about 160	53	Codominant	Fair; some dead branches, possibly the result of exposure
4	6±	—	27±	—	Dead stub about 6 feet high; top on ground

* $4\frac{1}{2}$ feet above the ground.

[1] The trees were discovered by Ranger P. W. Swedberg of Moose Lake, Minnesota.

Fig. 1. Distant view of hemlock trees located near Mille Lacs, Minnesota.

Fig. 2. Close-up of trees shown in Figure 1. Numbers refer to tree numbers of Table 1.

level and 100-foot tape and diameter measured by a diameter tape. Age was determined as accurately as possible from increment borings.

The trees are located near the foot of a slight slope rising from a poorly-drained area. Although the soil is shown as peat in the soil map of Mille Lacs County,[2] a closer examination showed it to consist of a somewhat sandy, clay loam, becoming heavier in texture with depth. Orange and brick-red mottlings at about two feet gave evidence of a fluctuating water table which at that time was found at 33 inches. A thin layer of leached, gray soil (A_2) was noted in one place where the soil was disturbed, but none was present in the profile taken.

The surrounding forest is composed of an all-aged stand which is transitional between the white spruce-balsam fir-paper birch type, the climax forest of northern Minnesota, and the sugar maple-basswood type, the climax association of the southern part of the State. In order of their observed importance the trees present are balsam fir, yellow birch, black ash, white pine, and white spruce. Some sugar maple and paper birch also occur in small numbers, but basswood appears to be absent in the immediate neighborhood of the hemlock. From the composition it is evident that the stand, although transitional between the two climax associations, tends more toward the white spruce-balsam fir-paper birch type than toward the deciduous climax.

Since the area has been cut over at various times in recent years for spruce and paper birch (birch stumps 16 to 18 inches in diameter were seen), the stand is generally irregular and open. In the proximity of the hemlock group, it is somewhat denser, however. At present the area is also used for pasture.

Because of the cutting and the grazing, the future of these trees and this botanical station is not very promising. Reproduction of hemlock and also of other species, probably because of the grazing, was practically absent at least from the vicinity of the old trees. Although only about a dozen one- or two-inch hemlock seedlings were found, chiefly on an old, badly-decayed stump of this species, others may possibly have been concealed

[2] Bodman, G. B., et al, 1932, Soil Survey of Mille Lacs County, Minnesota. U. S. Department of Agr. Bur. Chem. and Soils Series 1927, No. 37, 46 p., illus, map.

by the light cover of snow present at the time the observations were made.

The snow also made it impossible to obtain a complete list of all the species of vegetation in the proximity of the hemlock group. However, the following species, some of which were probably introduced along with the livestock, were noted: *Dryopteris intermedia*, *Carex* spp., *Maianthemum canadense*, *Polygonum* sp., *Coptis trifolia*, *Mitella nuda*, *Ribes Cynosbati*, *Fragaria* sp., *Rubus idaeus* var. *aculeatissimus*, *Trifolium repens*, *Cornus canadensis*, *Verbascum Thapsus*, and *Lonicera canadensis*.

Specimens collected from the trees may be found in the U. S. National Herbarium at Washington and in the herbarium of the University of Minnesota.

At the present time the only hemlocks definitely known to exist in Minnesota are: the Mille Lacs trees; two trees which have been known for a few years in Jay Cooke State Park near Duluth; a lone tree in Township 41 North, Range 17 West, Pine County; and a few along the St. Croix River north of Taylor's Falls. In earlier days, according to Winchell,[3] the species was known to occur in small groups or stands at several locations in the east-central part of the State, namely, in the vicinity of Brookston and Paupores in St. Louis County (this included a stand of about 300 acres), near Askov in Pine County, near Moose Lake and in the neighborhood of Howell, both in Carlton County. Although the State Division of Forestry has made an exhaustive search for these trees in recent years, all traces of them, with the possible exception of those near Howell which are likely the same as the present Jay Cooke Park trees, have been obliterated, probably by the severe fires of 1918 or earlier years.

No previous record, however, is known to exist of the Mille Lacs trees. Since these are about thirty miles farther to the west than the westernmost of the stations reported by Winchell (the Moose Lake trees), it is readily apparent that this location represents a considerable extension in range for this species. Rumors have been heard of hemlocks even farther west than

[3] Winchell, N. H. 1896. Geology of Carlton County. *In* Final Report Minn. Geol. and Natural History Survey 4:6.

the Mille Lacs station, but it seems doubtful if these are authentic. On the other hand, it is believed careful study will reveal others in the eastern part of the State, particularly in the St. Croix Valley.

To prevent the species from being completely lost to the State, the Division of Forestry is keeping close watch over both stations and is collecting seed every time there is a crop. Some 2000 seedlings from seed thus collected are now being grown in the State Nursery at Badoura. Although just what disposition will be made of these seedlings is not known, it is believed they will be used to restock some of the areas where the species occurred in former days.

Lake States Forest Experiment Station
St. Paul, Minn.

Wool-waste grasses at Yonkers

H. A. Gleason

On July 18 and September 24, 1898, Mr. George V. Nash made small collections of grasses from the vicinity of a woolen mill in Yonkers. These specimens were recently turned up among some old papers at the New York Botanical Garden and sent to Washington for identification by Mr. J. R. Swallen.

Twenty-three species are included in the collection, of which nine are listed by Taylor in his Flora of New York. *Dactyloctenium aegyptium* (L.) Richt. and *Cynodon Dactylon* (L.) Pers. are noted by Taylor as rare weeds in our vicinity; *Eragrostis poaeoides* (L.) Beauv. as a rare and local weed; *Hordeum murinum* L. as rare as a ballast weed; *Sporobolus cryptandrus* (Torr.) Gray as known only from Fairfield County, Conn., perhaps introduced; *Heleochloa schoenoides* (L.) Host as not very common as a weed. The other three are common weedy grasses.

Two species, *Bromus japonicus* Thunb. and *Hordeum vulgare* L., are not listed by Taylor, but are frequent over wide ranges of territory.

Four are native American species with ranges extending from our plains states south to Texas: *Chloris virgata* Sw., *Sporobolus airoides* (Torr.) Torr., *Sporobolus argutus* (Nees) Kunth, and *Aristida adscencionis* L. Five have ranges extending from Texas to Arizona and southward into or through Mexico: *Chloris ciliata* Sw., *Trichloris mendocina* (Phil.) Kurtz, *Pappophorum bicolor* Fourn., *Pappophorum mucronulatum* Nees, and *Tragus Berteronianus* Schult. The overlapping of these nine species in Texas suggests very strongly that the wool in which seeds were carried was imported from that part of the country.

There still remain two species not listed in Hitchcock's recent Manual of the Grasses, *Pennisetum ciliare* (L.) Link and *Andropogon Ischaemum L.*, and one other, *Cenchrus barbatus* Schum., reported by Hitchcock only on ballast at Mobile.

New York Botanical Garden
New York, N. Y.

Note on Fraser's sedge in Pennsylvania

Ralph V. Mostoller

Carex Fraseri Andrews. Fraser's Sedge. This plant was first collected by the writer on July 26, 1934, after being attracted to it by its broad leaves, caespitose habit of growth, and because it was growing deep in the woods. On June 21, 1935 this plant was collected in bloom. This sedge was found in a rich hemlock woods along Clear Run in Stoneycreek Township, Somerset County, about 3 miles northeast of Shanksville. The manuals state that it is a plant of the southern Appalachians, occurring locally in southwestern Virginia, West Virginia, eastern Tennessee, and North Carolina. According to records at the Carnegie Museum of Pittsburgh, this is the first record for the species in Pennsylvania and is evidently a northward range-extension. Specimens of this plant collected by the writer are now in the herbarium of the museum.

Stoystown, Pa.

Lichens on the Pilgrim Fathers

While on a trip to Cape Cod, to collect Cladoniae, I stopped in Duxbury, to see the little old pine covered cemetery, where John and Priscilla Alden and Captain Myles Standish are buried. On the graves of both of the Aldens are handsome colonies of *Xanthoria parietina*, also a *Lecanora*, probably *cinerea*, and a *Rhizocarpon*. On the walls of the enclosure about the grave of Myles Standish, with the boulder and cannon in the centre, are well fruiting colonies of *Physcia ciliaris*, also *Xanthoria parietina*, *Lecanora*, sp., *Rhizocarpon*, sp., and *Parmelia conspersa*.

The Cladoniae on Cape Cod are marvellously ample in number and vigorous in condition, with apothecia occurring on species which we usually find sterile in the New York region. *Cladonia Boryi* is by far the most numerous species, and, in the form *reticulata*, is usually heavily fruiting, making a pretty plant. But it will take more trips to gather material for a complete account of the Cladoniae of the Cape, as a part of a work on the Cladoniae of the Atlantic Coast, from North Carolina to Cape Cod, which I am now planning.

Raymond H. Torrey

FIELD TRIPS OF THE CLUB

Week-End at the Lake Mohonk Mountain House, October 23–25, 1936

The majority of the group arrived on Friday evening and stayed through until Sunday afternoon. The accommodations were at the Lake Mohonk Mountain House. Eighteen members and friends were present with Daniel Smiley, Jr., as leader.

On Saturday morning the start was made in a heavy fog, accompanied by the notes of cornet across the Lake. Within an hour it began to clear and soon the sun was out brilliantly showing the late autumn foliage at its best. The route was over roads and trails through a variety of country on the 7,000 acres of the Mohonk property. Rhododendron swamp was visited. Box lunches were waiting for the party at the old log cabin which was built about 1770.

The afternoon route led through a fine stand of hemlock, through Glen Anna and eventually to Sky Top where the panoramic view of the valleys and mountains in the late afternoon light was enjoyed. The mileage for the day was 8.3.

On Sunday morning, 4.9 miles were covered, the route being to Kleinekill Lake. On the return trip, the Mohonk Green House was visited.

Due to the dampness on Saturday, mosses and lichens were in particularly fine condition and many species were observed with interest. A small colony of Selaginella rupestris was found on Sunday. A goodly number of plants, actually in blossom, were noted. The total being 42. (See attached list for species.) Many of these were late blossoms from plants that had been cut down earlier in the season. Of particular interest were the fruiting plants of two species of *Ilex*, the common Winterberry *I. verticillata* and the rare, large-leaved Holly, *I. monticola*. The large berries of the latter made it a very showy shrub as we found it along the trails.

Plants found in blossom included the following: Deptford Pink, *Dianthus Armeria;* Bladder Campion, *Silene latifolia;* White Campion, *Lychnis alba;* Buttercup, *Ranunculus acris;* Corydalis, *Corydalis sempervirens;* Wild Strawberry, *Fragaria virginiana;* Rough Fruited Cinquefoil, *Potentilla recta;* Red Clover, *Trifolium pratense;* Alsike Clover, *T. hybridum;* Hop

Clover, *T. agrarium;* Yellow Sweet Clover, *Melilotus officinalis;* White Sweet Clover, *Melilotus alba;* Cuphea, *Cuphea petiolata;* Queen Anne's Lace, *Dacus Carota;* Indian Pipe, *Monotropa uniflora;* Blueberry, *Vaccinium vacillans;* Stiff Gentian, *Gentiana quinquefolia;* Vipers Bugloss, *Echium vulgare;* Self Heal, *Prunella vulgaris;* Common Mullein, *Verbascum Thapsus;* Butter and Eggs, *Linaria vulgaris;* Blue stemmed Goldenrod, *Solidago caesia;* Showy Goldenrod, *S. speciosa;* Hairy Goldenrod, *S. rugosa;* Early Goldenrod, *S. serotina;* White Wood Aster, *Aster divaricatus;* New England Aster, *A. Novae-Angliae;* Heart-leaved Aster, *A. cordifolius;* Bushy Aster, *A. dumosus;* White Top Aster, *A. umbellatus;* Lowrie's Aster, *A. Lowrieanus;* Lance leaved Aster, *A. sp.*; Daisy Fleabane, *Erigeron* sp.; Black-eyed Susan, *Rudbeckia hirta;* Yarrow, *Achillea Millefolium;* Canada Thistle, *Cirsium arvense;* Field Thistle, *Cirsium discolor;* Knapweed, *Centaurea maculata;* Chicory, *Cichorium Intybus;* Oyster Plant, *Tragopogon pratensis;* Rattlesnake Weed, *Hieracium scabrum;* Dandelion, *Taraxacum officinale.*

The following species of birds were observed: Ruffed Grouse, Marsh Hawk, Red Tailed Hawk, Downy Woodpecker, Crow, Starling, Bluejay, Ruby Crowned Kinglet, Chickadee, Hermit Thrush, Gold Finch, Junco, White Throated Sparrow.

Daniel Smiley, Jr.

PROCEEDINGS OF THE CLUB

Meeting of October 21, 1936

The meeting was called to order by First Vice-President F. E. Denny at 3:30 P.M. at the New York Botanical Gardens with 38 members and visitors present.

The minutes of meetings of May 20 and October 6 were read and approved. Mr. Eugene Gross, 30 Nye Avenue, Newark, N. J., Miss Clara Ketcham, Bennett Avenue and Columbia Street, Hempstead, L. I. were elected as Associates of the Club. Prof. E. B. Babcock, University of California, Berkeley, Calif.; Mr. Geo. M. Lash, 189–30 37th Avenue, Flushing, L. I.; Mr. A. Rabinowitz, 1010 President Street, Brooklyn, N. Y.; and Miss Viola Richtberg, 2305 Andrews Avenue, New York City, Dr. C. E. Taft, Ohio State University, Columbus, Ohio; were elected to membership.

Prof. T. E. Hazen, official delegate and representative of the Club to the Centenary Celebrations of the Botanical Society of Edinburgh, reported that he attended the meeting in Scotland during July and was enthusiastically received.

The Club then voted to revise the resolution of Jan. 8, 1936, by substituting the word "associate" for "field member." The Club also unanimously approved of the motion of the Council that a printed ballot with nominees for each office be mailed to all members of the Club prior to the Annual Meeting.

Dr. F. E. Denny, Chairman of the Committtee on Constitutional Amendments, reported that this Committee had met and taken into consideration the establishment of the offices of Recording and Corresponding Secretary to replace the single existing office of Secretary.

The scientific part of the program consisted of the relating of summer collecting experiences of the members.

Mr. George T. Hastings reported the discovery of a peculiar red oak on Riverside Drive in New York City, by Dr. Leon Croizat. In this connection Dr. R. A. Harper called attention to the existence of a grove of hybrid oaks at Cliffwood and emphasized the desirability of its preservation.

Dr. R. Fulling related that he had visited Virginia and the Shenandoah National Park during the summer and found an interesting fir whose cones are quite different from those of

Abies balsamia and *Frazeri*. He believes it is either a new species or a variety whose distribution is limited to the Blue Ridge Mountains.

Mr. Raymond H. Torrey, Chairman of the Field Committee, reported on his botanical excursions to Gardners Island with the Club by boat, and on a trip around the Gaspe Peninsula to study the lichens of that region.

Mrs. G. P. Anderson related her experiences in the Great Smokies collecting lichens and her visit to Williamsburg, Va., and the serpentine barrens in Pennsylvania.

Mrs. Mabel Merriman reported on her observations concerning the ecological invasion and succession of plants in the flooded areas of her farm in Northfield, Mass.

Dr. M. A. Howe, President of the Club, described his tour through Vermont and a visit in New Hampshire to the estate of Clarence Hays with its beautiful rock garden and display of gentians.

J. S. KARLING
Secretary

MEETING OF NOVEMBER 18, 1936

The meeting was called to order by the President at 3:30 P.M. at the New York Botanical Garden with 38 members and guests present. The minutes of the meeting of October 21 were read and adopted.

The resignations of Charles F. Irish, Jerome Metzner, Professor Lewis F. Tiffany, and Miss Marjorie Swift were accepted with regret.

Mrs. Berry Hiss, Short Hills, New Jersey; Sister M. Hyacinth, 3901 Ridgway Avenue, Chicago, Illinois; Miss Emma Johnson, 166–17 33rd Avenue, Flushing, Long Island; Mr. Harry Sverdlick, 144–32 Liberty Avenue, Jamaica, New York; and Dr. Geo. L. Zundell, Pennsylvania State College, State College, Pa., were unanimously elected to membership.

Miss Francis Beardsley, 2289 Loring Place, N. Y. C.; Miss Clara Elsaesser, 120 Auburn Street, Paterson, New Jersey; Miss Mary Little, 387 East 29th Street, Paterson, New Jersey; Mr. Jerome Metzner, 1014 Manhattan Avenue, Brooklyn, N. Y.; Miss Irene Nelson, 524 East 236 Street, New York City; and Miss Anne I. Stryker, 11 East 32nd Street, N. Y. C., were unanimously elected Associates of the Club.

The Secretary then reported the death of Mr. D. H. Grant, an Associate of the Club.

Dr. F. E. Denny read the amendments which had been proposed relative to the Office of Secretary and the Secretary was instructed to send out a special notice to all members that these amendments would be voted on at the next meeting.

The President then read a letter from the Chairman of the Field Committee, Mr. R. H. Torrey, calling attention to lack of interest and discussion of taxonomic and ecological problems in our Tuesday evening meetings. After considerable discussion, the matter was referred to the Council for consideration.

The Secretary called attention to the fact that the 3rd Wednesday of December occurred a week before the Christmas holidays. A motion was made and carried that an exception to By-Law No. 3 be taken and a meeting held on December 16.

The Scientific Program consisted of talks by Dr. F. E. Denny of the Boyce Thompson Institute for Plant Research on "Production of Ethylene by Plants" and by Dr. Alan L. Martin of Columbia University on "The Toxicity of Selenium to Plants and Animals." Both talks created animated discussion.

J. S. Karling
Secretary

Meeting of December 1, 1936

The meeting was called to order by 2nd Vice-President H. A. Gleason at 8:15 at the Museum of Natural History with 47 members and guests present.

Dr. David A. Krebs, Pennsylvania State Forest School, Mt. Alto, Pa., and Mr. Standly Smith, 204 College Avenue, Ithaca, N.Y., were unanimously elected to membership. The resignations of Leonard Irving, Mrs. Charlotte Stimson, Dr. Anne M. Wellvitz, and Mrs. Sophie Wolfe, were accepted with regret.

The Scientific program consisted of an address by Dr. H. A. Graves of the Brooklyn Botanical Garden on "Breeding Chestnut Trees." The speaker presented the data which he had so far secured in breeding hybrid chestnuts for resistance to *Endothia parasitica*, the chestnut blight fungus. The address was illustrated with colored slides and stimulated vigorous discussion.

J. S. Karling
Secretary

Marshall Avery Howe

Dr. Marshall Avery Howe, President of the Torrey Botanical Club, died at his home in Pleasantville on December 24th of a paralytic stroke. Dr. Howe had been connected with the Torrey Club for 39 years. In 1901 when the club decided on the publication of a magazine on the local flora and the activities of the club Dr. Howe was chosen editor of TORREYA, continuing with this work until 1908, when he became editor of the Bulletin of the Club. After he relinquished this position he remained on the editorial board of the club until his death. In 1922 and 1923 he served as secretary of the club and in 1936 became president.

He was born at Newfane, Vermont, in 1867. He graduated from the University of Vermont in 1890 and received the degree of Ph.D. from Columbia University in 1898. From 1891 to 1896 he was instructor in cryptogamic botany at the University of California, and from 1898 to 1901 he was curator of the herbarium and instructor in botany at Columbia. In 1901 he became a member of the scientific staff of the New York Botanical Garden, becoming assistant director in 1923 and director in October 1935.

Dr. Howe was an authority on the hepatics and on marine algae. He was particularly interested in growing dahlias, irises and peonies. The dahlia border at the Garden, which attracts more visitors than any other display there, was first developed through the efforts of Dr. Howe in 1918 and has been under his care since.

NEWS NOTES

Dr. Frederick V. Coville, botanist of the United States Department of Agriculture, died at his home in Washington on January 9th in his seventieth year. Dr. Coville graduated from Cornell University in 1887. For two years he remained at Cornell as instructor in botany, then became assistant botanist in the United States Department of Agriculture. In 1890 he was appointed botanist of the Death Valley Expedition of the U. S. Biological Survey and reached Death Valley about the first of January 1891, spending nearly eight months in field work in the valley and the neighboring mountains. His report, published by the Smithsonian Institution, was a notable one, describing many new species of plants as well as listing all the known forms the party found. Dr. Coville is probably best known for his work in "Taming the Wild Blueberry." The cultivation of blueberries and the development of improved large varieties are direct results of his work. Dr. Coville was active in botanical work both in the Department of Agriculture and in the Botanical Society of America. He was also interested in geography and was a life trustee of the National Geographical Society.

The U. S. Department of Agriculture has published a circular listing 193 plants widely used by wild life. Each of the plants listed is an important source of food for at least ten kinds of wild birds or mammals. Most of the plants are also recommended for soil-erosion control. The circular, prepared by W. L. McAtee, is No. 412 and may be obtained from the Superintendent of Documents, Washington, D. C. for five cents.

The New York Academy of Sciences awarded the A. Cressy Morrison prize for 1936 to Dr. Albert F. Blakeslee, A. Dorothy Bergner and Amos G. Avery, of Cold Spring Harbor, for their work on "The Geographic Distribution of Chromosomal Prime Types of the Jimson Weed."

Norman Taylor, editor of the Garden Dictionary, has just returned from England. He will continue as editorial adviser for Houghton Mifflin Company for garden and natural science books.

The Botanical Society of America at the business meeting at Atlantic City, held in connection with the meetings of the

American Association for the Advancement of Science during Christmas week, elected the following officers for 1937: R. E. Coker, president; H. de Forest, vice-president; Orland Park, secretary-treasurer.

The Museum of Natural History of Syracuse University was destroyed by a fire which destroyed the top floor of Lyman Hall on January 1. The fire was first observed in the office of Dr. Ernest Reed, head of the department of botany, who is in Venezuela on a scientific expedition. Among the many specimens destroyed, some of them irreplaceable, were more than fifty rare plants that had not yet been identified.

The botany departments of Cornell University and Ohio State University have arranged an exchange of instructors for this spring. Dr. E. M. Palmquist, of Cornell, and Dr. C. E. Taft, of Ohio State have been selected for the exchange. Both will teach courses of general botany.

Llewelyn Williams, assistant curator of economic botany at the Field Museum of Chicago, left early in January on an expedition of several months in southern Mexico to obtain botanical collections for the museum. Work will be concentrated on the Isthmus of Tehuantepec. (Science)

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A journal devoted to general botany, established in 1870 and published monthly, except during July, August, and September. Vol. 63, published in 1936, contained 562 pages of text and 20 full page plates. Price $6.00 per annum. For Europe, $6.25.

In addition to papers giving the results of research, each issue contains the INDEX TO AMERICAN BOTANICAL LITERATURE—a very comprehensive bibliography of current publications in American botany. Many workers find this an extremely valuable feature of the BULLETIN.

Of former volumes, 24–63 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–18 are now completed. Volume 17, containing Proceedings of the Semi-Centennial Anniversary of the Club, 490 pages, was issued in 1918, price $5.00.

Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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Bronx Park,
New York, N.Y.

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EDITED FOR
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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

Vol. 37 March-April, 1937 No. 2

A review of some medicinal plants

Part 1*

S. C. Bausor

A compilation of even a short list of plants is a cryptic history of the accumulation of empyric knowledge by primitive and civilized peoples throughout the world. The circumstances leading to the original use of plants in combating disease can only be conjectured. It seems quite natural that primitive man should have known the virtues of the flora surrounding him, since it provided him with sustenance. He learned by trial and error to distinguish the food plants from the poisonous ones and that the latter produced symptoms like disease. The next progressive step was the application of these "disease-producing" plants as a cure for disease itself. A similar principle is used today in immunology by serum treatment and in dermatology in the treatment of allergies.

History is fragmentary with respect to the first account of medicinal plants. The earliest extant work is thought to be that of a certain Dioscorides which is as recent as the beginning of the Christian era. This work was used as an authority through the Middle Ages. During the Renaissance physicians attempted to describe with more accuracy the plants of Europe having known or reputed medicinal value, in order to clarify the confusion which had grown up around them as a result of trying to recognize in them duplicates of the plants of the East described by Dioscorides. The work of these herbalists[1] led gradually to a broader view of the nature of plants in general and of medicinal plants in particular.

* Part 2 of this paper, describing medicinal plants of our local flora, will appear in the next number of Torreya.

[1] Agnes Arber, "Herbals," 1912.

Following this start, pharmacognacists gradually brought together the knowledge of medicinal plants from all parts of the earth and sought to determine more accurately the chemical and biological properties of these plants. Today this body of data is collected encyclopedically in the Pharmacopoeias and Dispensatories.[2]

Our most valuable medicinal plants are collected from far and near. The following is a selection of some of the more important drugs of vegetable origin, their sources, and uses.

I—Most Important Vegetable Drugs

1. Digitalis. The leaves of the flowering plant *D. purpurea* L. (Foxglove) are dried and used in preparation of a fluidextract, infusion or tincture. The active principles, glucosides, also are employed. It is probably our most useful heart stimulant. The infusion is used as a diuretic. Cultivated extensively.
2. Strophanthus. The ripe seeds of *S. Kombe* Oliv., of tropical East Africa, are made into a tincture. Its action is similar to that of Digitalis. Active principle: one or more glucosides. The natives of Africa use it as an arrow-poison, much as curare (Strychnos) is used among the South American Indians.
3. Opium. Derived from the latex of the incised, unripe fruit (capsule) of the opium poppy, *Papaver somniferum* L. It contains many alkaloids of which morphine is the most important. Its narcotic properties are well known. Cultivated in the Orient, chief source of the world's supply.
4. Coca. The dried leaves of *Erythroxylon Coca* Lam., cultivated from time immemorial at high elevations in the Andes. Cocaine is extracted from the leaves and used chiefly as a local anaesthetic.
5. Ergot. The resting mycelium (sclerotium) of the fungus *Claviceps purpurea* (Fries) Tulasne which replaces the grain of grasses, especially rye. Ergot is prepared for use as a fluidextract, infusion, or tincture. Its alkaloids also are employed. The most valuable application is in the

[2] Official in this country are The Pharmacopoeia of the United States of America, XI rev. Easton, Pa., 1936, and The Dispensatory of the United States of America XXI ed., Philadelphia and London, 1926.

later stages of labor, since it causes contraction of the muscles of the uterus.

The following drugs, Nos. 6–12, are used as purges. The multiplicity of drugs with similar physiological properties is of assistance to the physician in cases of individual idiosyncrasies to a particular plant. In addition, these drugs have somewhat different properties, all acting as cathartics, but in different ways.

6. Castor oil. Expressed from the seeds of *Ricinus communis* L. Its purging action is followed by constipation and therefore it is valuable in cases of diarrhoea. Widely cultivated in tropical and subtropical localities.
7. Rhubarb. The rhizome and roots of several species of *Rheum*, especially *R. officinale* Baillon, growing in China and Thibet. It is useful for diarrhoea in children.
8. Senna. The dried leaves of several species of *Cassia*. Prepared as an infusion, fluidextract, syrup; a valuable laxative not followed by constipation.
9. Cascara Sagrada. The dried bark of *Rhamnus Purshiana* DC. In addition to its purging action it acts as a tonic. Prepared as a fluidextract and aromatic extract. Native to Northwestern United States and Canada.
10. Aloe. Juice of the leaves of *Aloe Perryi* Baker, *A. vera* L., *A. ferox* Miller. Prepared as a tincture and pills. Used in cases of chronic constipation. Its purging action is slow.
11. Jalap. Root of *Exogonium Jalapa* (Nutt. and Core) Baillon. Prepared as a fluidextract, tincture, etc. A hydragogue cathartic.
12. Croton oil. Expressed from the seeds of *Croton Tiglium* L. This probably is the most powerful purgative known. The dosage is very small, large doses being lethal.
13. Hyoscyamus. The leaves and flowering tops of *Hyoscyamus niger* L. (Henbane). Prepared as a fluidextract, tincture, etc., it is used in cases of nervous disorder because of its sedative action. Its active principles are at least two alkaloids, hyoscyamine and scopolamine. Widely cultivated in Europe.
14. Valerian. The rhizomes and roots of *Valeriana officinalis* L. prepared as a tincture. It contains a volatile oil which has sedative properties.

15. Asafoetida. The gum-resin from incised rhizomes and roots of *Ferula asafoetida* L., and other species of *Ferula*. Prepared as an emulsion, in pills, and as a tincture. Used as an antispasmodic, expectorant, and as a carminative. Its sedative properties are considered by some to be psychic.
16. Viburnum. Bark of the root of *Viburnum prunifolium* L. (Black Haw) or *V. Lentago* L. (Wild Raisin). Prepared as a fluidextract; claimed to be a uterine sedative.
17. Gelsemium. Rhizomes and roots of *Gelsemium sempervirens* (L.) Persoon (Yellow Jasmine root). Prepared as a fluidextract, extract, and tincture. Useful as a sedative for headache, asthma, whooping cough, etc.
18. Nux vomica. The seed of *Strychnos Nux-vomica* L. containing the alkaloid strychnine. It is prepared for use as an extract, fluidextract and tincture. This drug is probably the most powerful nerve stimulant known to man.
19. Caffeine. An alkaloid obtained from tea (leaves) and coffee (seeds), but also from other unrelated plants. Properties: stimulant and diuretic.
20. Camphor. A ketone obtained from *Cinnamomum Camphora* (L.) Nees and Ebermaier. It has many pharmaceutical preparations such as liniments, ointments, etc. Its most valuable application is as a stimulant in the crisis of an illness.
21. Santonica. Unexpanded flower-heads of *Artemisia pauciflora* (Ledeb.) Weber, and other species. It contains santonin, used to expel round worms.
22. Aspidium. The rhizome and stipes of *Dryopteris Filix-mas* (L.) Schott (Male Fern). The oleoresin is used as a taenicide. It is our most efficient remedy for tapeworm.
23. Thymol. Obtained by refrigeration of the oil derived from *Carum copticum* Benth. and Hook. (Ajowan oil), *Thymus vulgaris* L. (Oil of Thyme), and other plants. The former is the most important commercial source. It is a powerful antiseptic and is used internally in typhoid fever, dysentery, etc. It is a specific for hookworm.
24. Uva Ursi. The leaves of *Arctostaphylos Uva-ursi* (L.) Spreng. (Bearberry). A fluidextract and infusion are made from the leaves. It is valuable as a diuretic.

ASPIDIUM
ERGOT
BELLADONNA
HENBANE
DIGITALIS
GENTIAN
DIGITALIS
HYOSCYAMUS
CASCARA
SENEGA
LOBELIA
MAY-APPLE
PEPPERMINT
WILD CHERRY
STRAMONIUM
GELSEMIUM
UVA URSI
EUCALYPTUS
OLIVE
JALAP
GINGER
ALOE
BALSAM
of PERU
TOLU
CINCHONA
PILOCARPUS
ERGOT
UVA URSI
SQUILL
OLIVE
SANTONICA
RHUBARB
EPHEDRA
GALLA
SAFOETIDA
MYRRH
THYMOL
CASTOR OIL
CROTON OIL
CAMPHOR
NUX VOMICA
GINGER
SENNA
ALOE
CALABAR BEAN
STROPHANTHUS
ALOE BUCHU
CHAULMOOGRA OIL
GAMBIR
CINCHONA
NUX VOMICA
EUCALYPTUS
Distribution of Important Drugs of Vegetable Origin
Longitude West from Greenwich
Longitude East from Greenwich

25. Buchu. Leaves of *Barosma betulina* (Thunb.) Bartling & Wendland. Prepared as a fluidextract and infusion. Employed in genito-urinary diseases.
26. Squill. Bulb of *Urginea maritima* (L.) Baker. Prepared as a fluidextract, etc; employed as a diuretic in dropsy. Also used as an expectorant.
27. Black Mustard. Seeds of *Brassica nigra* (L.) Koch, widely distributed in temperate regions. Used chiefly as a counterirritant in the form of a poultice.
28. Flaxseed. The seeds of *Linum usitatissimum* L. Universally cultivated. Prepared as an infusion it is used as a demulcent to protect the mucous membranes of the alimentary tract from irritation.
29. Olive Oil. Oil from fruit of *Olea europoea* L. It is valuable as a demulcent and mild laxative.
30. May-apple. Rhizome and roots of *Podophyllum peltatum* L. The resin and fluidextract are used. This drug is valuable as a liver invigorator and also as a slow purge.
31. Peppermint. The leaves and flowering tops of *Mentha piperita* L. It contains a volatile oil used as a carminative. Menthol, an alcohol obtained from the oil, is used to relieve head and tooth aches and in preparations for nasal spray.
32. Ginger. Rhizome of *Zingiber officinale* Roscoe. Used as fluidextract, oleoresin, syrup, and tincture; applied internally as a carminative, externally as a rubefacient. It is sometimes used as snuff. Widely cultivated in tropical countries.
33. Gambir. The dried extract of leaves and twigs of *Ourouparia Gambir* (Hunter) Baill. Prepared as a tincture. It owes its properties chiefly to a high tannic acid content, and is employed as an astringent. Useful in diarrhoea and chronic gonorrhoea.
34. Galla. Galls produced on twigs of *Quercus infectoria* Oliv. and other species of Oak. The powdered galls are prepared as an ointment. Its astringent properties are due to a high tannin content.
35. Myrrh. A gum resin obtained from several species of *Commiphora*. As a tincture it is used locally for spongy gums, indolent ulcers, etc. It also has tonic properties.

36. Gentian. Rhizome and roots of *Gentiana lutea* L. Prepared as a tincture, elixir, etc. It is employed as a tonic to whet the appetite. (Angostura bitters, used in cocktails, contains gentian as an ingredient.)
37. Senega. Roots of *Polygala Senega* L. Prepared as a fluidextract, infusion or syrup. Used as an expectorant. It is valuable for chronic bronchitis.
38. Tolu. A balsam obtained from *Toluifera Balsamum* L. Prepared as a tincture or syrup; an expectorant.
39. Prunus Virginiana. Bark of *Prunus serotina* Ehrh. Prepared as a syrup, sometimes used as a tonic or to soothe the mucous membranes of larynx and bronchi.
40. Ipecac. Root of *Cephaelis Ipecacuanha* (Brotero) A. Richard. Prepared as a fluidextract, syrup, tincture, etc. It is used as an expectorant in small doses and as an emetic in larger doses.
41. Belladonna. Leaves and roots of *Atropa Belladonna* L. The leaves are prepared as a tincture, ointment, and plaster; the roots as a fluidextract, liniment, suppositories. It is used to check secretions (sweat, urine, saliva). The alkaloid atropin is used to dilate the pupil of the eye.
42. Pilocarpus. Leaflets of *Pilocarpus microphyllus* Stapf, or of *P. Jaborandi* Holmes. Prepared as a fluid extract. Stimulate the flow of sweat and urine. It contains the alkaloid pilocarpine which acts as a myotic when applied to the pupil of the eye.

42a. Calabar Bean. Seed of *Physostigma venenosum* Balfour from which the alkaloid physostigmine is obtained. It also causes the pupil of the eye to contract.

43. Cinchona. The dried back of several species of *Cinchona* prepared as a tincture, elixir, infusion. It contains the alkaloid quinine used as a specific in malaria.
44. Eucalyptol. Obtained from the oil of *Eucalyptus globulus* Labillardière; used as an expectorant in pulmonary diseases, and also as an antiseptic dressing. The oil itself is used for this purpose also.
45. Stramonium. Leaves of *Datura Stramonium* L. Prepared as an extract or tincture, similar to Belladonna in physiological activity. The dried leaves are smoked to relieve asthma.

46. Lobelia. Leaves and flowering tops of *Lobelia inflata* L. (Indian Tobacco). Prepared as a fluidextract or tincture, used in the treatment of asthma.
47. Balsam of Peru. Obtained from *Toluifera Pereirae* (Royle) Baill. It is applied locally in treatment of indolent ulcers.
48. Ephedrine. The alkaloid of *Ephedra sinica* Stapf. Its properties are similar to those of adrenalin but are more lasting in effect.
49. Staphisagria. Seeds of *Delphinium Staphisagria* L. Prepared as a fluidextract which is employed externally to combat lice and mites.
50. Chaulmoogra oil. From the seeds of *Taraktogenos Kurzii* King. It is used as a specific in the treatment of leprosy.

The above list, though incomplete, contains most of the drugs of vegetable origin used in the practice of pharmacy today. The accompanying map shows the commercial source of most of them.

It will be noted that many of them are native or cultivated in our own country. We need not go far afield to discover useful medicinal plants. Our local flora is rich in species, many of which, however, have fallen into disuse with the decline in the preparation of home remedies, the substitution of cheaper or more efficacious foreign products, and with the innovation of synthetic substitutes.

Columbia University
New York City

Water content of leaves of Acer rubrum from different habitats and different levels[1]

Lois Jotter

The aim of the investigation was to obtain definite figures regarding the relative water content of leaves from trees growing in varying habitats, as well as a comparison of the water content of upper and lower leaves from the same tree.

Methods

As three habitats, namely pineland aspen,[2] bog, and dry aspen seemed to furnish the desired extremes for comparison, as well as being characteristic of the region, trees were selected from these habitats, and in addition from a fourth group comprised of trees growing in variable situations. The dry aspen habitat was located on a very dry, sandy ridge, to some extent covered by typical aspen plants, but not a normal aspen association due to the extreme lack of moisture and shade.

Acer rubrum trees, used because the species was present in all of the desired situations, were located permanently for all but the variable group, leaves being taken from the same trees at each collection. In as far as possible, selected trees were comparable in height and spread of branches. From these trees leaves were collected in the early afternoon, when the maximum amount of evaporation would be expected.

Collections, made from the upper and lower portions of each tree, consisted of typical, healthy leaves, cut off approximately five millimeters from the point where the petiole joins the blade. After cutting, leaves were put into tightly corked and properly labeled bottles, and immediately upon return from the field were weighed, then oven dried to a constant weight. The expression of water content was based on this dry weight of the leaf.

Data

The resulting data clearly indicates that the water content of leaves varies with the habitat, as leaves from trees in the bog had the lowest water content, those from the dry aspen area

[1] Based upon work done under the direction of Dr. Frank C. Gates, during July and August 1935, at the University of Michigan Biological Station.

[2] This association is fully described in: Gates, F. C., Aspen Association in Northern Lower Michigan. Bot. Gaz. 90: 233–259. 1930.

were intermediate, and those from the general aspen area had the highest water content. The averages of percentage water content as obtained from the various collections were as follows: bog situation—112, 126; dry aspen—121, 134; and general aspen—142, 154. In each case the first figure given refers to leaves from the upper portion of the tree, and the second figure to the lower leaves.

The idea that trees in bog situations are as unfavorably located in regard to the availability of water as are trees in a dry situation, is supported by data indicating the much lower water content for the leaves of the bog trees than for those from the dry aspen area, in spite of the fact that transpiration must be much less in the bog situation.

The fact that the trees of the general aspen area should have a higher water content than those of the much drier aspen ridge, shows the correlation between the availability of water and the water content, as the situations are comparable in soil and in plant association, with the amount of water in the soil and the transpiration rate as the only variable factors.

The data also indicate that upper leaves of *Acer rubrum* contain significantly less water than the lower leaves of the same trees. A certain amount of correlation of the amount of water present in the leaf with the general weather conditions is shown by the fact that leaves collected after a prolonged period of hot, dry weather had a water content markedly lower than that of leaves collected only a few days after good rains. The lowest percentage of water found in leaves, 107%, was in the upper leaves of the bog trees on August 8, and the highest, 165%, in the lower leaves of the general aspen habitat on July 3.

Summary

An investigation of the water content of upper and lower leaves of *Acer rubrum* from different habitats on northern lower Michigan during the summer of 1935 showed that at the driest time of the day upper leaves normally had less water than lower leaves (126:140) and that leaves of trees in bogs had less water in them than trees on dry ridges, and these in turn less than trees in the general mesophytic aspen association (119:128:148).

University of Michigan
Ann Arbor, Michigan

Sphaerophysa Salsula, new to North America

E. J. Alexander

While driving along the highway in southern Colorado the past August 27, near the town of Monte Vista, a bushy growth bearing racemes of orange flowers drew the writer's attention. Upon examination, it was seen that the plant was a legume with inflated papery pods. Now, as orange-flowered legumes are exceedingly rare in the North American flora, manuals were at once searched for the plant's identity. There seemed to be nothing even related to it recorded, so specimens were made and seed collected for future examination.

Recently, in looking over the specimens and making a more complete check, the plant still could not be matched with anything known in North America. In thinking over the various leguminous genera with orange flowers, *Colutea* came to mind—there might be an herbaceous species of that woody Asiatic genus. Again a blank was drawn, so Bentham & Hooker's Genera Plantarum was consulted, and it was plainly indicated that the plant belonged in the sub-tribe *Coluteae*. It being highly improbable that an Antipodean plant could have established itself in temperate North America, the Asiatic genera were examined, and the plant was soon identified beyond doubt as *Sphaerophysa Salsula* (Pall.) DC., native of northern and central Asia, the genus merged by some botanists with *Swainsona*, a strictly Australian genus. In either case, the discovery of this plant adds a new genus and species to the North American flora, but its source in that locality is a matter of conjecture. In that section, the highway and railroad run parallel for some miles, separated by a 100-foot strip of ground filled with grass and weeds, a logical situation for an introduced plant. *Sphaerophysa* grows in that strip of ground, in at least a half dozen colonies scattered over as many miles, and always within ten feet of the highway.

The plant is about three feet tall, gregarious, in general appearance much like an erect *Astragalus*, the stems arising from underground, woody rootstocks. The leaves are alternate, 5–7 cm. long, with 9–19 elliptic to obovate leaflets 5–10 mm. long, the pairs subopposite. The entire plant is closely strigose-puberulent except for the upper surface of the leaflets and the

corolla. The flowers are 12–15 mm. long, and are borne in erect, axillary, pedunculate racemes 6–15 cm. long, the peduncles about the length of the subtending leaves. The pedicels are 5–8 mm. long. The calyx is campanulate, 3–4 mm. long, the teeth about 1 mm. long, acute, the two upper separated from the three lower by a broad, shallow sinus. The corolla is red-orange, the upraised standard with a bilobed yellow spot at the base of the blade, the keel yellow except for the apical third. The stamens are diadelphous, the ovary stipitate, densely fine-pubescent, the style barbate on the upper side, the stigma capitate. The fruits are bladdery-inflated, one-celled, paper legumes, rounded at the tip, finely pubescent and borne on deflexed pedicels, the protruding stipes again reflexed, bringing the pod to a horizontal position. The seeds are small and numerous, black, orbicular-reniform.

New York Botanical Garden
Dec. 1936

Since writing the above, the writer has identified for the Carnegie Museum, Pittsburgh, a specimen of *Sphaerophysa Salsula* collected near Fruitland, Utah, by Margaret T. Doutt on August 14, 1936.

E. J. A.

Jan. 1937

BOOK REVIEWS

Four recent texts in general botany

R. C. Benedict

A comprehensive survey of the whole field of botanical teaching in the United States would probably disclose upwards of thirty different general texts in current use. For each some special value or purpose might be advanced; e.g., adaptation for particular teaching situations and courses; predilections of teachers; tradition, etc. There are botanies designed for high school courses; others for half year college courses, etc. The present notes are not intended as an appraisal of the whole field, or as a selection of any texts as the best in the field, but merely to call attention to certain distinctive features of four volumes recently examined, and all designed for use in a year course in general college botany.

Brown, William H. The plant kingdom. Ginn & Co. 1936. $3.50.

Dr. Brown has drawn upon his long experience in the Philippines for a great many illustrations of interest and significance which are not to be found in other texts. While the plants illustrated are often strange and unfamiliar, their relevancy to the topics justifies their use, and they constitute a feature of unusual value and interest. This volume is excellent, both for illustrations and textual materials. In respect to primitive Palaeozoic vascular plants, it is probably the most complete of the general botanies. In this connection, however, it is surprising to find the following too-broad generalization: "The structure of the Psilophytales fits in very well with the long-accepted idea that the Pteridophyta are derived from the Bryophyta."

Sinnott, E. W. Principles of botany. McGraw-Hill Co. 1935 (3rd ed.). $3.50.

The Sinnott text is too well known to need any extended characterization. It is featured by its logical organization, the lucidity and accuracy of its statements, and by the special development of pedagogical helps, i.e., review and problem questions. Designed as a text for a "principles" course, the book is less encyclopaedic than a number of other recent volumes, a point in keeping with its general plan. It is a matter of interest

to note that Dr. Sinnott classifies all vascular plants under one phylum, the "Tracheophyta," thus dispensing with the traditional distinction between Pteridophyta and Spermatophyta. The reviewer is in accord with the view but it may seem too radical a change to some botanists.

Torrey, R. E. General botany for colleges. Appleton-Century Co. (2nd ed.) 1932. $3.50.

The Torrey text is characterized by the originality of its point of view and design; by a more distinctive philosophy of teaching than is to be found in other botanies. The author's belief in the general significance of his subject and his enthusiasm for it are infused throughout the volume. The author's concept of "general botany" comprises (1) a survey of the general external structure and morphology of seed plants, along Asa Gray lines, (2) a consideration of the comparative anatomy, histology, and evolution of vascular plants, with "indebtedness to Prof. E. C. Jeffrey," and (3) the "evolution of the plant kingdom." Genetics is represented by a single mention of the word in one of the early pages. Torrey has preceded Sinnott in the idea of a monophyletic classification of vascular plants on the basis of the tracheid. However he uses a name, "Tracheata," less acceptable than Tracheophyta, especially since the former word already has a definite zoological significance.

The real test for such an original text would best be determined after its use, either as a regular text or as collateral reference. It seems likely, however, that students would gain a broad perspective of the field of botany. It is difficult to be sure whether this issue is a "first" or "second" edition. Apparently the 1932 issue under Appleton-Century Co. auspices has involved the reissue of the original 1925 edition of the author, plus a Preface and an Introduction.

Hill, J. B., Overholts, L. O. and Popp, H. W. Botany. McGraw-Hill Co. 1936. $4.00.

This Penn State botany is the most compendious of the four here reviewed, and perhaps the most extensive of the general texts of American origin. Less individually distinctive in any special way than the other three here reviewed, it commends itself for its comprehensiveness of treatment. As a textbook and

as a reference work, it seems destined for widespread use. It has a fine color plate for a frontispiece, and the illustrations have been carefully chosen and prepared and are beautifully reproduced.

Brooklyn College, and
Brooklyn Botanic Garden

PROCEEDINGS OF THE CLUB

Meeting of December 16, 1936

The meeting was called to order by Vice-President H. A. Gleason at 3:30 p.m. at the New York Botanical Garden with 28 members present. The minutes of the meetings of November 18 and December 1 were read and adopted.

The Secretary then read the following proposed amendments to the Constitution and By-Laws which were unanimously adopted:

To amend Article III—Officers—by (1) substituting in paragraph 1 for "Secretary" the words *Recording Secretary* and *Corresponding Secretary*. (2) Inserting in paragraph 2 before "Secretary" the word *Corresponding*.

To amend Article VII—Secretary—by striking out the existing paragraph and substituting the following:

Article VII—Secretaries

The Recording Secretary shall keep full and accurate records of the membership and proceedings of the Club and Council; notify each member of his election and report to the Treasurer the name and residence of each member elected, and perform other duties of a similar nature as may be assigned by the Club from time to time.

The Corresponding Secretary shall have charge of the Charter, Seal, Constitution, By-Laws, and Records of the Club. He shall give due notice of all meetings, conduct the correspondence of the Club and prepare all letters to be written in its name, retaining copies of them. He shall serve as Chairman of the Program Committee and Exchange Committee on Publications, and perform other duties of a similar nature as may be assigned by the Club from time to time.

To amend Article 10—Council—by (1) changing in line 1, paragraph 1, the word "nineteen" to *twenty*. (2) Inserting before the first "Secretary" in line 4, paragraph 2, the word *Recording*. (3) By inserting after the word "or" in the last line of paragraph 3 the words *either of the Secretaries*.

To amend Article 14—Resignation of Members—by inserting before "Secretary" the word *Recording*.

To amend Article 21—Amendments—by inserting before "Secretary" the word *Corresponding*.

To amend By-Law 6—Program Committee—by striking out the last line and substituting the following: *The Corresponding Secretary shall be Chairman of the Committee.*

In connection with these amendments the Secretary pointed out that there was no provision in the Constitution of the Club for the Business Manager, although he has been listed as an officer and annually elected since 1919. It was further pointed out that the Exchange Committee on Publications was not listed in the By-Laws as a Standing Committee, although its nature and character were as permanent as those of the Local Flora, Field, and Program Committees.

Following the adoption of the amendments, the Chair appointed Professor T. E. Hazen as chairman of a committee to arrange for the Annual Banquet and Meeting to be held on January 5, 1937. The Secretary then brought up the question as to the desirability of appointing a Budget Committee. Professors E. B. Matzke, M. A. Chrysler, H. N. Moldenke, T. E. Hazen, and Mr. G. T. Hastings were appointed and requested to present a budget for consideration of the Council at its next meeting.

The Chairman of the Field Committee, R. H. Torrey, told of the efforts of the Hudson River Association to prevent the stone quarry at Mt. Taurus from further defacing the cliffs of the Hudson. Following this, it was moved that the Secretary write to the Governor of New York endorsing the activities of the Hudson River Association and urging him to exert utmost pressure for the removal of this quarry.

The Scientific Program consisted of an illustrated talk by Dr. H. N. Moldenke on "Five Thousand Miles Through Europe." Dr. Moldenke related his experiences in the various her-

baria throughout Europe and exhibited numerous specimens which were collected in different countries.

J. S. KARLING
Secretary

MEETING OF JANUARY 5, 1937

The meeting was called to order at 8:25 P.M. at the Faculty Club of Columbia University following the Annual Dinner, by Vice-President F. E. Denny, with 59 members and guests present. Misses Clyde Chandler and Lela Barton and Drs. W. G. Camp and R. Pratt were appointed by the Chair to count the ballots for officers for 1937. The minutes of the meeting of December 16 were then read and adopted.

Miss Agnes Sullivan, 191–12 Hollis Ave., Hollis, L. I., was elected to membership, and Misses Rhona E. Lawrence and Ann M. Wyckoff and Mr. J. Landon Rhodda were approved as Associates.

The resignations of Dr. Wm. Marquette, Dr. Bessie Goldstein, Mrs. Lucy Abbe, Miss Mary Jo Cobb, Mrs. Dorothy Francis Allen, Miss Matilde Otero, Miss Fanny A. Mulford, and Mr. B. A. Krukoff as Active Members, and Miss Mabel E. Newman and Mr. Benjamin Wunder as Associates were accepted with regret.

The annual reports of the Secretary, Treasurer, Editor, Associate Editor for Torreya, Business Manager, Bibliographer, Delegate to the New York Academy of Sciences, and the Chairman of the Field Committee were read and adopted.

Under the heading of old business the Secretary again pointed out that there was no provision in the Constitution of the Club for the Office of Business Manager although this officer had been elected annually since 1919, and urged that some action be taken to bring the Constitution in line with our practice. After some discussion, a motion was introduced by Dr. R. A. Harper that the same committee which drew up the amendments relative to the Offices of Corresponding and Recording Secretary be appointed to take action on this matter. The motion was unanimously carried.

The Secretary then read a letter from Dr. C. Stuart Gager, Director of the Brooklyn Botanic Garden, urging some con-

certed action by all metropolitan scientific societies in securing the representation of science as such at the World's Fair to be held in 1939. No definite action was taken by the Club.

The Chair then appointed Drs. Harper, Dodge, and Graves as a committee to draw up resolutions relative to the death of our late President, Dr. M. A. Howe. Following this, the Treasurer presented the budget for 1937, which had been approved by the Council, and it was unanimously adopted. Mrs. R. A. Harper, Drs. R. C. Benedict, and F. T. McLean were appointed to audit the Treasurer's books for 1936.

Dr. E. D. Merrill, of Harvard University, then spoke of the practice of the New England Botanical Club of giving undergraduate and graduate students of botany junior membership in its organization, which might later be changed to full membership if they desired, and suggested that this might possibly be done by the Torrey Club. After considerable discussion, Dr. Zimmerman moved that the matter be referred to the Council for further consideration. Dr. R. Pratt then reported the results of the annual election—the officers elected being those whose names appear on the inside of the front cover.

The meeting adjourned at 9:45 P.M.

Respectfully submitted,
J. S. KARLING
Secretary

CORRECTIONS

On page 19 of the January–February number of Torreya the date of the resolution given as January 8, 1936 should have been January 8, 1935.

On pages 23 and 24 the officers given for the Botanical Society of America should have been for the Ecological Society of America. The officers elected by the Botanical Society, are Dr. E. W. Sinnott, president; Dr. Loren C. Petry, vice-president; Dr. George F. Avery, Jr., secretary; Dr. F. E. Denny, treasurer.

NEWS NOTES

Indoor Meetings to be Arranged by the Field Committee

With the approval of the President of the Torrey Botanical Club, and of the Chairman of the program committee, the field committee plans to hold a number of indoor meetings in the spring and fall of 1937, to discuss subjects of chief interest to those who enjoy the field trips, which may be classed under the general title of "floristics," including taxonomy, ecology, plant distribution, etc. Since it was felt by the program committee that the professional botanists in the club are interested in other phases of botany, at the regular indoor meetings, and since there was evidence of a demand for taxonomy, ecology, etc., on the part of a number of amateur botanists, and active leaders of fields trips, the field committee proposed to Dr. Barnhart and obtained his approval, for the experiment of holding another series of meetings for the presentation and discussion of subjects of that sort.

It is planned to hold these meetings on the second or third Mondays of spring and fall months, Mondays being chosen because many members will have been in the field the day before and will have collected fresh material to bring in for determination and discussion. It is expected that meeting places will be found, at the American Museum of Natural History, at Columbia University, at the Newark Museum, Newark, N. J.; possibly also at the building of the Horticultural Society of New York, and at the Brooklyn Botanic Garden. Some dates, places and subjects will be announced in the field schedule booklet, when it appears about April 10; others may be left until fall, for perfection of their programs. Announcements will also appear in the bulletin of the New York Academy of Sciences. This new series of indoor meetings is an experiment, to be given a trial during 1937, and the response to and success of the gatherings will determine whether they should be continued.

Raymond H. Torrey

Dr. Duncan Star Johnson, since 1906 professor of botany and director of the botanical garden at the Johns Hopkins University, died on February 16 at the age of sixty-nine years.

Benjamin Franklin Bush died on February 14 at his home in Courtney, Missouri. For forty years, until his retirement a few years ago, he was postmaster in his native village. He was an authority on native plants, birds and reptiles. In 1898 and 1899 he made a trip covering 50,000 miles with the late Charles S. Sargent of Harvard in a study of oaks. From 1900 to 1913 he collected shrubs and other plants for Harvard.

Dr. William R. Maxon, since 1914 associate curator in charge of the National Herbarium in the U. S. National Museum under the Smithsonian Institution, has been made curator. (Science)

Fifteen acres of woodland have been added to the Connecticut Arboretum at Connecticut College, New London. The arboretum has been set aside for the preservation of native plants of the state.

Dr. William Henry Weston, Jr., professor of botany and chairman of the department at Harvard University has been appointed visiting professor of mycology at the Johns Hopkins University. (Science.)

On March 2 Mr. John Grimshaw Wilkinson died at his home in Leeds, England in his eighty-first year. Although blind he had identified and classified more than a thousand plants by the sense of touch. He was an honorary Master of Arts in Leeds University.

The Brooklyn Botanic Garden sent out a special news release in early March regarding the flowering at the garden of a tree rare in this country, *Parrotia persica*, the iron tree or Temir-Agatsch, of northern Persia and the region of Mt. Ararat. The tree is a member of the Witch Hazel Family with leaves like those of our native witch hazel, but the bark scaling like that of the sycamore. When the flowers open in early March the thickly clustered stamens peeping from the green bud scales look like young wild strawberries, but by the time the stamens are ready to shed pollen the filaments have lengthened and pushed the anthers out from the buds.

THE TORREY BOTANICAL CLUB

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Of former volumes, 24–63 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

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Correspondence relating to the above publications should be addressed to

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

Vol. 37 May–June, 1937 No. 3

A review of some medicinal plants

Part 2—*Medicinal Plants of Our Local Flora**

S. C. Bausor

The following is a list of 100 of the more common plants possessing remedial virtues, found within the range of the Torrey Club's field excursions.

1. *Aspidium marginale* (L). Sw. (Marginal Shield Fern). The rhizome and stipes are used as a remedy for tapeworm. It is closely related to No. 22, List I.
2. *Lycopodium clavatum* L. and other species (Club-Moss). The spores are used to coat pills to prevent them from adhering to one another. Also they are employed in the manufacture of some dusting powders.
3. *Acorus Calamus* L. (Sweet Flag). The rhizome is tonic and may be eaten as such, or made into an infusion.
4. *Veratrum viride* Ait. (American White Hellebore). The rhizome and roots prepared as a fluidextract or tincture are used as a sedative. It has the effect of reducing the blood pressure.
5. *Polygonatum biflorum* (Walt.) Ell. (Small Solomon's Seal). The rhizome was formerly used in fluidextract as a tonic, for gout and rheumatism.
6. *Trillium erectum* L. (Birthroot), and other species. The rhizome has been used as an oxytocic, hence its common name.
7. *Iris versicolor* L. (Larger Blue Flag). An extract or fluidextract of the rhizome is diuretic and cathartic, large doses emetic.

* Part 1 of this paper appeared in the March-April number of Torreya.

8. *Cypripedium parviflorum* Salisb. (Smaller Yellow Lady's Slipper), also the Var. *pubescens* (Willd.) Knight (Larger Yellow Lady's Slipper). A tincture prepared from the rhizome and roots stimulates the nervous system, acting as an antispasmodic.
9. *Salix sp.* (Willow). The bark contains a glucoside called salicin, and tannin, as its chief constitutents. In infusion or decoction it was formerly employed as an antiperiodic. Salicylic acid was originally derived from Salicin, but it is now made synthetically from phenol. Salicylic acid is used as a stomatic and its sodium salt is administered hypodermically in the treatment of rheumatism. It is a constituent in the manufacture of Aspirin.
10. *Populus candicans* Ait. (Balm of Gilead). The buds are covered with a resinous substance from which a fluidextract is prepared and used as an expectorant. As an ointment it is applied to indolent ulcers.
11. *Juglans cinerea* L. (Butternut). The bark of the root prepared as a fluidextract is reputed to be effective in the treatment of dysentery and constipation.
12. *Betula lenta* L. (Sweet Birch). Contains a glucoside, Gaultherin, which is decomposed by water to oil of wintergreen. This is the commercial source of the oil. Oil of wintergreen is used in liniments for muscular rheumatism, etc.
13. *Quercus alba* L. (White Oak). Infusion or decoction of the bark is used as an astringent. It owes its properties to a high percentage of tannic acid.
14. *Ulmus fulva* Michx. (Slippery Elm). The inner bark contains a mucilaginous substance, whence it is used as a demulcent to alleviate irritation of the throat, etc.
15. *Rumex crispus* L. (Yellow Dock). The root is used in the treatment of skin diseases; as a decoction, administered internally and as an ointment or decoction, applied externally.
16. *Chenopodium ambrosioides* L. (Mexican Tea, also called American Wormseed). The oil, or a decoction made from the ripe fruits, is used to expel worms, particularly in children.
17. *Phytolacca decandra* L. (Common Pokeweed). The root was

formerly used in treatment of chronic rheumatism. It is sometimes used for skin diseases applied externally as an ointment; administered internally as a tincture or decoction.

18. *Stellaria media* (L.) Cyrill. (Common Chickweed). The herb is sometimes used as a poultice for bruises, etc.
19. *Portulaca oleracea* L. (Common Purslane). The herb has diuretic properties.
20. *Castalia odorata* (Ait.) Woodville & Wood (Sweet-scented Water Lily). The rhizomes are highly astringent and are recommended for cases of diarrhea and dysentery.
21. *Ranunculus bulbosus* L. (Bulbous Buttercup). The plant is used as an irritant, causing the skin to blister.
22. *Hepatica triloba* Chaix. (Liverleaf). The leaves boiled into a decoction are used as a tonic.
23. *Coptis trifolia* (L.) Salisb. (Goldthread). The rhizome and roots are mainly used. It is chewed or used as a mouthwash for cankersores, as a gargle for sore throat, and sometimes as a tonic. Prepared as a decoction.
24. *Cimicifuga racemosa* (L.) Nutt. (Black Snakeroot). The rhizome prepared as an extract or fluidextract affects the circulation, slowing the pulse rate and lowering the blood-pressure. It is used sometimes as digitalis. It is useful in treatment of St. Vitus's dance.
25. *Actaea alba* (L.) Mill. (White Baneberry). The rhizome has violent purgative and irritant properties.
26. *Hydrastis canadensis* L. (Golden Seal). The rhizome contains two alkaloids, hydrastine and berberine. It is prepared as a fluidextract, extract, tincture, or the purified alkaloids may be used. It is efficacious in remedying chronic inflammation of mucous membranes in the stomach, intestines, vagina, etc. It also has been used to stop uterine hemorrhages.
27. *Magnolia virginiana* L. (Sweet Bay). The bark is prepared as a decoction or made into a tincture with brandy. It has tonic and diaphoretic properties and also is a remedy for malaria.

27a. *Liriodendron Tulipifera* L. (Tulip Tree) has similar properties.

28. *Podophyllum peltatum* L. (May Apple). See List I.

29. *Caulophyllum thalictroides* (L.) Michx. (Pappoose Root). The fluidextract of the rhizome and roots has been used in treatment of hysteria, and also in uterine diseases.
30. *Berberis vulgaris* L. (Common Barberry). The root, containing berberine among other alkaloids, is used as a tonic.
31. *Sassafras variifolium* (Salisb.) Ktze. (Sassafras). The oil distilled from the root is used as a flavoring, chiefly to disguise the presence of disagreeable drugs. The pith contains a gum which forms a mucilage with water and is used to soothe inflamed eyes or as a medium for the application of other drugs.
32. *Sanguinaria canadensis* L. (Blood Root). A tincture of the rhizome is used as an expectorant in bronchitis. In larger doses it is emetic. Applied locally it is used to stimulate indolent ulcers and as a remedy for fungus diseases.
33. *Chelidonium majus* L. (Great Celandine). An infusion of the plant has sedative properties. The fresh juice (latex) has been used in treatment of skin diseases.
34. *Capsella Bursa-pastoris* (L.) Medic. (Shepherd's Purse). The plant is diuretic and tonic.
35. *Heuchera americana* L. (Common Alum Root). The root contains a high tannin content and is therefore an excellent astringent.
36. *Hydrangea arborescens* L. (Wild Hydrangea). A fluidextract prepared from the roots is diuretic. It is claimed to expel small stones from the kidneys.
37. *Hamamelis virginiana* L. (Witch Hazel). A distilled extract or a fluidextract of the leaves is used as an astringent lotion.
38. *Potentilla canadensis* L. (Cinquefoil). An infusion of the herb is used as an astringent.
39. *Rubus sp.* (Bramble). A fluidextract or decoction or syrup prepared from the bark of the rhizome is used as a tonic and astringent. It is used also as a household remedy for diarrhea.
40. *Prunus serotina* Ehrh. (Wild Black Cherry). See List I.
41. *Cassia marilandica* L. (Wild Senna). Has laxative properties. See No. 8, List I.

42. *Baptisia tinctoria* (L.) R. Br. (Wild Indigo). The root prepared as a decoction or tincture acts as a violent emetic and cathartic. It also is used externally in lotions and ointments for chronic ulcers.
43. *Cytisus Scoparius* (L.) Link (Scotch Broom). A decoction of the tops of the plants has diuretic properties. Sparteine, one of the active principles, affects the heart and circulation and is sometimes used as a heart regulator.
44. *Melilotus officinalis* (L.) Lam. (Yellow Melilot) and *M. alba* Desr. (White Melilot). The dried leaves and flowering tops are prepared as a poultice to relieve pain.
45. *Geranium maculatum* L. (Wild Cranesbill). The rhizome is administered as the powdered drug, or prepared by decoction. It is astringent and is useful in relieving internal hemorrhages.
46. *Ailanthus glandulosa* Desf. (Tree of Heaven). The powdered bark is used as a nerve depressant. It owes its properties to a volatile oil.
47. *Polygala Senega* L. (Seneca Snakeroot). See Senega, List I.
48. *Mercurialis annua* L. (Mercury). Used as an alterative in syphilis. It is also used as a purge.
49. *Euphorbia Ipecacuanhae* L. (Wild Ipecac). The root had emetic properties.
50. *Rhus glabra* L. (Smooth Sumach). An infusion of the fruits is astringent and refrigerant and used as a gargle in acute inflammation of the throat.
51. *Acer rubrum* L. (Swamp Maple). The bark is a mild astringent and was used by the Indians as a wash for sore eyes.
52. *Impatiens pallida* Nutt. (Pale Touch-Me-Not), also *I. biflora* Walt. (Spotted Touch-Me-Not). An infusion of the plant is used as a diuretic. The fresh juice is reputed to soothe the effects of ivy poisoning.
53. *Ceanothus americanus* L. (New Jersey Tea). The root has astringent properties due to a high tannin content. The leaves were substituted for tea during the Revolution.
54. *Psedera quinquefolia* (L.) Greene (Virginia Creeper). A fluidextract of the leaves has diuretic and refrigerant properties which are due to the presence of tartaric acid and tartrates.
55. *Tilia americana* L. (Basswood, Linden). and other species

of *Tilia*. The flowers are used in infusion for ailments due to a nervous condition, such as nervous headache and indigestion.

56. *Althaea officinalis* L. (Marsh Mallow). The mucilaginous properties of the infusion of the root are utilized as a demulcent in cases of inflammation of the gastro-intestinal tract.
57. *Hypericum perforatum* L. (Common St. John's Wort). The fresh plant when bruised has been used externally to relieve pain, bruises, etc., and taken internally for chronic catarrhal disorders.
58. *Helianthemum canadense* (L.?) Michx. (Frostweed). The whole dried plant is used as a bitter or tonic, and sometimes as a mild astringent.
59. *Epilobium angustifolium* L. (Fireweed). A household remedy used as an intestinal astringent.
60. *Oenothera biennis* L. (Common Evening Primrose). The leaves and flowering tops of this species, prepared as a fluidextract, control nervous spasms, hiccough, asthma and whooping cough.
61. *Aralia racemosa* L. (Spikenard). The rhizome and roots are prepared by infusion, decoction, or fluidextract for use as a stimulant and diaphoretic.
62. *Aralia nudicaulis* L. (Wild Sarsaparilla). Properties similar lar to *Aralia racemosa*.
63. *Conium maculatum* L. (Poison Hemlock). The action of this plant, which depresses the motor nervous system, is so unreliable and likely to be fatal that it is rarely administered internally. It is used externally as a plaster for neuralgia and as a poultice to relieve pain caused by cancer or ulcers.
64. *Cicuta maculata* L. (Spotted Cowbane). It has properties similar to *Conium* and is sometimes used in lieu of it. It is sedative and poisonous and demands the same precautions as *Conium*.
65. *Cornus florida* L. (Flowering Dogwood). The bark of the root prepared as a fluidextract is a mild astringent and aromatic bitter.
66. *Chimaphila umbellata* (L.) Nutt. (Pipsissewa), and *C.*

maculata (Spotted Wintergreen). The leaves are prepared as a fluidextract and exert a diuretic effect.

67. *Ledum groenlandicum* Oeder. (Labrador Tea). An infusion is used as tea and is somewhat narcotic. It is sometimes used in chronic bronchitis.
68. *Epigaea repens* L. (Mayflower). The leaves in decoction are used as a diuretic in cases of local irritation of the urinary tract.
69. *Arctostaphylos Uva-ursi* (L.) Spreng. (Bearberry). A diuretic. See List I.
70. *Limonium carolinianum* (Walt.) Britton (Sea Lavender). The root contains a high percentage of tannin and is used as a gargle in treatment of ulcers of the mouth.
71. *Fraxinus americana* L. (White Ash). The inner bark is prepared as a wine of white ash and the leaves are sometimes used in infusion. The bark is a tonic and astringent; the leaves are diuretic and purgative.
72. *Sabatia angularis* (L.) Pursh, and other species. These plants are used as bitters and tonics much as gentian is used to aid the appetite. See Gentiana in List I.
73. *Apocynum cannabinum* L. (Indian Hemp). The rhizome and roots are prepared for administration in various ways: infusion, tincture, fluidextract. It is a good diuretic. It affects the circulatory system in a manner similar to that of Digitalis (List I.)
74. *Asclepias tuberosa* L. (Pleurisy-root). The root is prepared as a fluidextract which is diuretic and carminative, and in large doses, cathartic and emetic. It is used in pleurisy and pneumonia to stimulate perspiration.
75. *Verbena hastata* L. (Blue Vervain). An infusion or fluidextract of the herb is used as an expectorant and also to stimulate perspiration. Large doses are emetic.
76. *Marrubium vulgare* L. (Common Horehound). The leaves and flowering tops are prepared as candy or syrup and used in bronchial affections.
77. *Nepeta Cataria* L. (Catnip). An infusion of the leaves and flowering tops has been used as an emmenogogic and sedative; also used to allay colic pains in infants.
78. *Hedeoma pulegioides* (L.) Pers. (American Pennyroyal). A

stimulating aromatic used in treatment of dyspepsia and colic.

79. *Collinsonia canadensis* L. (Rich-weed). A hot infusion of the root is used in the treatment of fever. It is tonic, diuretic and diaphoretic.
80. *Solanum Dulcamara* L. (Bittersweet). The stem and branches are used for making the powdered substance, extract, decoction, etc. It produces diuresis and stimulates the sweat glands. In large doses it is sedative and hypnotic. However, it is used chiefly in the treatment of skin diseases.
81. *Solanum carolinense* L. (Horse Nettle). The dried fruits have properties similar to *S. Dulcamara.*
82. *Datura Stramonium* L. (Stramonium). See List I.
83. *Verbascum Thapsus* L. (Common Mullein). The flowers have been used to relieve tubercular coughs, but it is of little value apparently. The leaves are mucilaginous and are used as a demulcent.
84. *Chelone glabra* L. (Balmony). The herb is used as a bitter tonic.
85. *Veronica virginica* L. (Culver's Physic). The powdered rhizome and roots act as a cathartic and emetic. Administered in substance or as a fluidextract.
86. *Plantago major* L. (Common Plantain). The leaves applied whole or as a poultice are sometimes used to stay a hemorrhage and also are applied to stimulate healing of epidermal sores.
87. *Mitchella repens* L. (Partridge Berry). An infusion of the stem and leaves has diuretic and tonic qualities.
88. *Cephalanthus occidentalis* L. (Buttonbush). The bark of the root is used for treatment of colds.
89. *Viburnum Opulus* L. (High-Bush Cranberry), and *V. prunifolium* L. (Black Haw). See List I.
90. *Lobelia inflata* L. (Indian Tobacco). See List I.
91. *Eupatorium purpureum* L. (Joe-Pye Weed). The roots and leaves have diuretic properties.
92. *Eupatorium perfoliatum* L. (Boneset). An infusion of the leaves and flowering tops is tonic, in large doses laxative. It is used mostly to abort incipient colds.
93. *Erigeron annuus* (L.) Pers. (Daisy Fleabane). An infusion

of the herb is diuretic. It also is used to stimulate the appetite and aid digestion.

94. *Ambrosia artemisiifolia* L. (Roman Wormwood, Ragweed). This plant is best known as a cause of Fall hayfever. It is gratifying to know that it has some useful qualities. The fluidextract of the flowering herb is astringent and used locally to stop bleeding. It is a bitter tonic sometimes used for dyspepsia.
95. *Achillea Millefolium* L. (Common Yarrow). The flowering herb is used usually in hot infusion, as a stimulant and tonic.
96. *Tanacetum vulgare* L. (Common Tansy). The leaves and tops are prepared especially as a hot infusion for a tonic, the removal of worms from the intestines and as a febrifuge in mild fever.
97. *Tussilago Farfara* L. (Coltsfoot). The decoction or infusion of the leaves is demulcent and tonic and is used in bronchial affections. The root is smoked to relieve coughs.
98. *Senecio aureus* L. (Golden Ragwort). A decoction or infusion of the rhizome and roots or of the aerial parts has been used as an emmenogogue.
99. *Arctium Lappa* L. (Great Burdock). A decoction of the root is diuretic. It also alters the course of diseases such as gout, rheumatism, syphilis and scrofula.
100. *Taraxacum officinale* Weber (Common Dandelion). A fluidextract of the root is tonic, laxative and slightly diuretic. It is used in treatment of dyspepsia and constipation.

Preparation for Use

Medicinal plant materials usually require special preparation to facilitate administering and to concentrate or isolate the active principles but the fresh or dried drug is sometimes used as such, without any special preparation. The majority of materials are brought into solution before using. The chief methods by which this is accomplished may be summarized briefly as follows:

1. Decoction—a method of extracting the active principle by means of actively boiling water.
2. Infusion—a method of separating the desired constituents

by allowing the raw drug to macerate in water. Usually a hot infusion is made by pouring boiling water over the material and allowing it to cool gradually.

3. Percolation—a method of extraction in which the solvent (menstruum) gravitates through the powdered material. The solution passing through is called the percolate.

   When the solvent is alcohol rather than water, the resulting solution is called a *tincture*. Tinctures may be made by maceration, and by percolation. The percolate, concentrated so that one cubic centimeter is equivalent to one gram of the dried drug, is known as a *fluidextract*. When a percolate is evaporated to a solid or semi-solid, the resulting product is called an *extract*.

4. Distillation—a process of evaporation followed by condensation. Volatile oils are collected in this way.

5. Special methods, used in purifying the active principles. The chemical and physical nature of the compound determines the method applied.

In conclusion I wish to acknowledge thanks to my father, Charles Bausor, for many suggestions in the preparation of this paper.

Columbia University
New York City

Is Tilia americana L. valid?

Leon Croizat

Is *T. americana* L. valid? The answer of Sargent is negative (Bot. Gaz. 66: 424–425, 1918), and is presented with the support of evidence that seems to be uncontrovertible. *T. glabra* Vent., favored by Sargent, is used now in the majority of works treating the flora of the Eastern States. Certain authors have used in turn Linnaeus' and Ventenat's binomials. Many rule out *T. americana* believing it to be *species multipla*.

The American Linden of Linnaeus is presented (Sp. Pl. 1: 514. 1753) in a publication which, translated, reads as follows:

> *T. americana*—Linden with staminodes. Kalm
>
> Linden with somewhat broad mucronate leaves. Gron. virg. 58
>
> Linden with very broad glabrous leaves resembling our native kind. Pluk. mant. 181
>
> Hab. in Virginia and Canada. A tree.

Sargent tells us (o.c., 424), "Kalm's specimen is not in the Linnean herbarium, and it is impossible to identify it from the description which applies as well to any one of the 3 species which Kalm may have seen. Indeed both *T. neglecta* and *T. heterophylla Michauxii* are more common in the part of the country which he visited than the tree which recent authors have called *T. americana*, and it is impossible to identify Kalm's plant."

So far as the writer knows Kalm mentions the American Linden once (Trav. N. Am. 1: 69. 1770) without describing it. The *locus classicus*, *ex* Kalm, is Philadelphia. This type-locality does not conflict with the habitat of the species, *ex* Linnaeus, and does not exclude the Linden known to Sargent as *T. glabra*.

Kalm's note applies to numerous species of *Tilia* in America, Europe and Asia, and it is undeniable that the presence or absence of the staminodes is not primarily a specific character. Gronovius polynomial is tantamount to *nomen nudum*, for it describes no Linden in particular. Plukenet's polynomial, however, is definite: it introduces a Linden with very broad *glabrous* leaves "from Maryland," which resembles one of the English species of *Tilia*. It is unfortunate that Sargent pays attention

to the statements of Kalm and Gronovius, but fails to comment on Plukenet's Linden which has *glabrous* leaves.

The European Lindens "with hexagonal fruit" of Plukenet are not directly mentioned by Linnaeus in the announcement of *T. europaea* (Sp. Pl. 1: 514. 1753) and of its "varieties." They appear, however, in cross reference for var. *delta* and *epsilon* (cf. Ray, Syn. Pl. Angl. 3: 473, nos, 3, 4, 1724). The former "variety" is doubtful, and it may be suspected that Linnaeus accepted it through Ray, o.c. l.c., from Merret (Pin. Rer. Nat. Brit. 118. 1667) for the sake of a well rounded record, which is not surprising to botanists familiar with the method and the practice of Linnaeus. Var. *epsilon* is undoubtedly *T. platyphyllos*. Plukenet describes it, in translation, as follows (Almag. Bot. 368. 1696), "Native wild Linden with broad hirsute leaves and a 4–5–6-angled fruit." It is quite probable that Plukenet had *T. platyphyllos* in mind comparing the Linden of Maryland with very broad glabrous leaves with the Linden of England with broad hairy leaves. Anyone familiar with the European and American Lindens must agree that the comparison between *T. platyphyllos* and the Linden known to Sargent as *T. glabra* is fundamentally a happy one. The American Linden with *glabrous* leaves is not the species which modern authors understand as *T. heterophylla*, *T. Michauxii* or *T. neglecta*. All these have more or less thickly *tomentose* leaves.

Sargent having underestimated Plukenet's note, lays stress upon Gronovius' meaningless polynomial, wishing it to be noted that a Linden from Clayton's region cannot be *T. americana*. Sargent, unfortunately, misses the point that a proof presented on grounds of habitat and phytogeography requires a rigorous definition of geographic areas and a precise understanding of ecology. In the case under consideration the Virginia of Gronovius and of Linnaeus has the same value as the Maryland[1] of Plukenet and the Canada of Linnaeus, and no

[1] Plukenet (Mant. 181 1700) spells *Terra Moriana*, undoubtedly a misprint instead of *Terra Mariana*. No reference is implied to *Terra Moriana* or *Moriana* (on modern maps Maurienne) in Savoy, France. The fruit of the American Linden is said by Plukenet (o.c.l.c.) to be "identical to the fruit of our (English) Lindens." The note is to be broadly interpreted, because the fruit of *T. americana* is usually smooth, and that of *T. platyphyllos* more or less evidently ribbed. Plukenet in all probability alludes to the like nature of the fruit of the two species.

one may decide, barring cogent evidence to the contrary, whether Gronovius meant the mountains or the coast of Virginia, or the mountains and the coast of a nearby State. The scanty value of colonial maps is well illustrated by the proceedings of the meetings in which the thirteen original States settled their boundaries among themselves and with the Federal Government.

In conclusion: the presentation of *T. americana* must be interpreted in the absence of a type-specimen. It rests, consequently upon textual evidence. Textual uncontroverted evidence in Plukenet's polynomial points to a Linden having broad *glabrous* leaves. This Linden has a northern range, from Virginia to Canada, and the *locus classicus*, in a narrow sense, is Philadelphia. Only the species that Sargent calls *T. glabra* (Man. Tr. N. Am. 733–734. 1922) answers this description and this range. It follows that *T. americana* is valid and rules out the later *T. glabra* Vent. To this extent the writer fully agrees with Suringar (Meded. Rij. Herb. Leid. 56: 28. 1928), whose understanding of *T. europaea* L., and "varieties," will be discussed in a coming article.

New York City

Herbarium mounts in cellophane

D. DeLisa

During the summer of 1936 the writer began preparing herbarium specimens by enclosing them in cellophane. Pierce[1] has since described an essentially similar method and has noted that specimens mounted under cellophane preserve to a marked degree the natural colors of the leaves and flowers. As this use of cellophane has advantages not mentioned by Pierce, the procedure used by the writer together with the advantages of the method will be briefly reported.[2]

The procedure consists simply of enveloping in cellophane the herbarium sheet with the attached specimen. The edges of the cellophane are folded on the reverse side of the sheet and fastened down along their whole lengths with strips of adhesive cellophane. It was found, as Pierce also notes, that adhesive cellophane is superior to the ordinary gummed paper strips for fastening specimens to the sheet.

The most important advantage of this method is the prevention of the disintegration of specimens. It should be especially practicable for classroom herbaria and other herbaria which are subject to frequent handling. Since the enveloping cellophane is perfectly transparent, no difficulty is encountered in studying the specimen through a lens.

Much of the natural color is preserved by the use of cellophane. Although sufficient time has not yet elapsed to determine whether the colors are preserved indefinitely, the method promises excellent results. Pierce's statement that the exclusion of air is an important factor in the preservation of plant colors deserves to be borne in mind.

Another advantage is that periodic fumigation would probably be unnecessary if the mount were perfectly sealed. The greatly increased attractiveness of the mount is a further advantage, although there is one disadvantage in that roots which are too bulky cannot be included.

[1] W. Dwight Pierce, SCIENCE, 84: 253–254, 1936.

[2] The writer's attention has been called to an unsigned note in TORREYA 35: 161 which states that Fessenden used cellophane in preserving plant colors. Details of the method are not given, but Fessenden apparently used some chemical treatment to prevent the fading of colors.

For larger herbaria, cellophane envelopes whose single flaps could be easily sealed might be procured. The type of cellophane which is impermeable to gases and vapors would probably prove superior to the ordinary type in preserving the plant over a long period of time.

Union College
Schenectady, New York

BOOK REVIEW

A Monograph on the Genus Heuchera[1]

This monograph, chiefly the work of Dr. Lakela, is a culmination of previous treatments of this genus by Dr. Rosendahl, and brings to us a finished review of a most difficult group of plants, interesting especially because of its bicentric distribution in Western America and in the Appalachians. As in Dr. Pennell's admirable treatment of the Scrophulariaceae of eastern North America, this paper on *Heuchera* includes full citations of specimens (a necessity for monographic work), and we look to Dr. Rosendahl and his associates for a similar, comprehensive treatment of all the Saxifragaceae. *Heuchera* has expanded from 15 species known to Torrey and Gray in 1840 to the 51 species, many with varieties and forms included, treated in this paper. It is wholly a North American genus, most closely related to *Boykinia*, *Sullivantia*, and *Tiarella*, and more remotely to the genera centering about *Mitella*. *Boykinia*, with individually closed carpels, is the most primitive of these. As in practically all large genera, many segregations have been previously made, but only the monotypic *Conimitella* Rydberg (*H. Williamsii*), and the monotypic *Elmera* Rydberg (*H. racemosa*) are maintained. A detailed account (pp. 6–9) of the morphologic units relied upon for taxonomic differentiation: leaves, pubescence, floral characters, etc., is accompanied by a full-page illustration showing longitudinal flower-sections for each group, delineating especially the angle assumed by the hypanthium with respect to zygomorphy, and affording a better approach to identification of taxonomic sections (and therefore of species) than anything we have had in the past.

The outstanding interest in this paper, however, is the section (pp. 15–18) devoted to hybrids of *Heuchera*. Most of these are hybrids of *H. sanguinea*. At least one of the cultivated forms is a remarkable bigeneric hybrid (between *H. sanguinea* and *Tiarella*), but those of us who have vainly tried to place non-flowering plants of *Tiarella* within the genus *Heuchera* are will-

[1] A monograph on the genus Heuchera, Carl Otto Rosendahl, Frederic K. Butters and Olga Lakela. Pp. 1–180, fig. 1–5, 1936. The University of Minnesota Press, Minneapolis, $3.00.

ing to admit at least the close outward similarity of the genera, despite their actual floristic divergency. Here are records of greenhouse experiments, with actual production of hybrids between *H. Richardsonii* var. *hispidus* and *H. sanguinea* (a Mexican species), illustrated by good pictures of growing plants and flowers of parents and hybrids. *H. Richardsonii* with strongly zygomorphic, yellowish-green flowers belongs to the section *Heruchea; H. sanguinea*, in which the flowers are brilliant red and almost campanulate, belongs to *Rhodoheuchera*. The hybrids resemble large-panicled *H. Richardsonii*, but the flowers are "tubular campanulate, moderately irregular in form, and pink in color with greenish sepal-tips." Segregation of F_2 in Mendelian fashion brought out variants in height, color of flowers, and character of hypanthium. These gradually sifted out to about six strains, preponderantly like *H. Richardsonii*, and it is assumed that the *Sanguinea*-forms, being less hardy, died out first. "Just how to treat, taxonomically, such interbreeding groups is something of a puzzle. Obviously they have not quite attained to the full stature of species, as species occur in such a genus as *Carex*. They have reached a similar degree of morphological differentiation without attaining full biological independence. They are kept distinct in nature not through any biological incompatibility but merely by the accident of geographical isolation or, in a few cases, by differences in flowering periods; and these accidental barriers, whether of space or time, may at any time break down as a result of climatic changes resulting in extension of range or change in the time of flowering. In some instances this sort of thing appears actually to have happened in the not-distant past. Thus extending ranges of *H. americana* and of *H. Richardsonii* appear to have recently overlapped, and the two species are completely blended over an area of more than a hundred thousand square miles, though elsewhere they are perfectly distinct and are not even closely related. Presumably the failure of other groups to blend in a similar manner is due far more to geographical and historical than to biological causes" (p. 18).

In the accompanying map (fig. 5) these hybrids between *H. americana* and *H. Richardsonii* are seen to occur in a triangle extending from Michigan to Arkansas and Minnesota. Fitting such plants into ordinary taxonomy is accomplished by "recog-

nizing as species those entities with well-marked characters that maintain these characters over a considerable part of their range, even though they intergrade completely with some other species in certain regions, particularly where this intergradation is between forms that are obviously not closely related." These observations are bound to have an important place in all future treatments of natural hybrids.

The *Villosae* and *Micranthae* are the most primitive forms of the genus and both groups have species in the southern Appalachians. Although they represent primitive Tertiary stock, time has not been sufficient for them to spread into Asia. The *Hemsleyanae* of western United States appear to have come from certain *Micranthae*, isolated in the mountains of Mexico at an early period.

With the Western species and their subdivisions in the main taxonomic treatment (pp. 26–174), the reviewer has not had sufficient contact to pass judgment, but reduction of *H. macrorhiza* of the Alleghenies to a variety of *H. villosa* receives his whole-hearted approval.

This paper has been prepared with care, as may be seen from the geographic notes on obscure places and the cited details of Nuttall's itinerary in "Oregon" (p. 163, 164). Even the little slip-ups, which inevitably occur in a work of this scope, for example "Hort. Bldg." for "Hort. Belg." (p. 175, 176), are very infrequent; one obvious error, the lack of a specific name for *Heuchera alpestris* (p. 104) has been subsequently supplied by the authors themselves. The publication under review is not only the last word on *Heuchera* for systematic botanists, but it should be in the hands of all geneticists who are interested in the actual occurrence of hybrids in nature, and of horticulturists who contemplate growing these attractive plants.

H. K. Svenson

FIELD TRIPS OF THE CLUB

Trip of Sunday, February 28, 1937

An innovation in conducting field trips of the Torrey Botanical Club, which the field committee plans to make general during the 1937 season, proved very enjoyable on the trip led by Mr. G. G. Nearing, in the vicinity of Ridgewood, Bergen County, N. J. The morning and early afternoon were devoted to field study in woods and swamps, north and west of Ridgewood, the afternoon to indoor study, with high-powered microscopes, of lichen spores.

The party assembled in automobiles at Mr. Nearing's rhododendron nursery, on East Ridgewood Avenue, near Paramus Road, Ridgewood, at 10 A.M. They went first to an old farm owned by Mr. Nearing's family north of Ridgewood, where among the gray birches and red cedars, were found three Lycopodiums, *L. complanatum*, *clavatum* and *obscurum;* several Cladoniae, including *C. cristatella*, ff. *Beauvoisii*, *vestita* and *scyphulifera; C. mitrula; C. borbonica; C. coniocraea*, ff. *ceratodes* and *pycnotheliza; C. tenuis; C. subcariosa;* and *C. apodocarpa. Aspidium cristatum* was found among other ferns, in a swamp, with plenty of mosses, including much of *Georgia pellucida*.

The party then moved to a swamp, north of Midland Park, which was visited last year under the leadership of Mr. and Mrs. J. Van Saun, which is interesting for its survivals of species now rare in Bergen County, inluding *Larix laricina, Sarracenia purpurea, Drosera rotundifolia, Vaccinium macrocarpon*, and *Coptis trifolia*, and which is rich in mosses, and liverworts, among the latter *Pallavicinia* and *Cephalozia*. In exploring this swamp we moved around to its south end which we had not visited before, and found it contained about a dozen specimens, none very large, but with some small natural reproduction, of a spruce, probably *Picea mariana*, although in the absence of cones, we were not quite sure. This is probably the last remaining station for spruce, growing wild, in Bergen County, as former stations for *P. mariana* and *P. rubens* (*rubra*) on the east side of the Hackensack Meadows, near New Durham, and on the west slope of the Palisades are now probably extinct, due to cultivation and residential and industrial de-

velopments. This part of the swamp is on the property of Mr. Dent Smith, an investment dealer in New York City, who has his country place there. He has built plankwalks through the swamp, for access in high water. Although he has been annoyed by the vandalism of blueberry pickers, when he learned our objectives, he was very cordial, told us of his purpose of making the swamp a plant sanctuary, showed us his plantations of evergreens and hardwoods, and invited us to come again.

We then returned to Mr. Nearing's home and spent the rest of the afternoon, very enjoyably and instructively, examining lichen spores and material collected in the morning, under microscopes provided by Mr. Nearing, Mr. A. T. Beals and Mr. Louis W. Anderson. The beauty and complexity of internal form of the lichen spores were a revelation to those of us who had not seen them under magnification. Mr. Nearing also showed us a chart he is making, based on Fink's *Manual of North American Lichens*, to run down species on macroscopic and microscopic characters, which, when completed, should have great practical value for lichen students. Altogether the event, the first one so largely attended in the 1937 schedule, was a very enjoyable start for the season and proved the value of such combinations of field work, study and discussion.

Raymond H. Torrey

Week End Trip of April 30–May 2 to Lake Mohawk

Sheer cliffs, woods, fields, swamps—all have a fascination for those with seeing eyes. And so the thirty-one Torrey members and their friends took up the trail again—a trail which on Saturday and Sunday led us through such diverse country that many types of plant associations were observed. Only a few herbs were seen in flower namely: Bloodroot, Fawn Lily, Dandelion, Wake Robin, Hepatica, Trailing Arbutus, Marsh Marigold, Pusseytoes, Round-leaved Violet, Early Saxifrage, Rue Anemone, Wood Betony, Painted Trillium, Dwarf Ginsena, Sweet White Violet, Crinkleroot, Golden Saxifrage, Downy Yellow Violet, Dog Violet and Pale Violet.

Distinctive vistas and botany claimed the interest of the majority of the group but a few of us were interested in Mohonk's biota-total life-community. Twenty-three species of

birds were observed; a ribbon black snake caught; green pickerel frog, wood frog and spotted salamander eggs were collected, also adult red-backed and dusky salamanders. The prize capture was a snapping turtle which weighed between 25–30 lbs. (for evidence see author's snapshots).

Evening programs were most interesting. Friday evening Mr. Louis Anderson showed his own splendid hand-colored insect and flower slides and some natural color slides. After a strenuous day on Saturday we relaxed to hear Dr. Perkins, Zoologist of the Second Byrd Expedition, show his motion pictures accompanied by an entertaining and educational talk.

Eleanor Friend

Trip of May 8

Twenty-five members and guests of the club and members of the Newark Museum Nature Club, under the leadership of the president of the latter club, Mr. Louis W. Anderson, enjoyed a warm spring day in the limestone country northeast of Andover, Sussex County, N. J. Mr. Anderson's chief objectives were *Cypripedium parviflorum* and *C. reginae* in wet woods around a lake east of route 31, a mile north of Andover. The season was late so no flowers, but plenty of plants of the former and a few of the latter were seen. Mrs. Rodda of Palmerton, Pa. showed us another station for both these orchids in the swamp southwest of Springdale. *Orchis spectabilis* was found in bloom near a small spring on the west side of the swamp, and in bud elsewhere, one clump containing a dozen plants.

A shrub new to some of the party, rare in the Hudson Valley, but commoner in Sussex County, was the Prickly Ash or Toothache Tree, *Xanthoxylum americanum*, in an old hedge along a farm road southwest of Springdale. It was in bloom, with the pinnate leaves just expanding. At the same point was one of the finest things seen during the day, a shallow pond filled with thousands of the flowering spadices of the Golden Club, *Orontium aquaticum*.

Other plants not often seen in our range were *Clematis verticillaris*, two plants in blossom on a limestone knoll north of Andover and the Globe Flower, *Trollius laxus*, a large blooming colony in a swamp north of Greendell.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

Meeting of January 20, 1937

The meeting was called to order by the President at the New York Botanical Garden with nineteen members present. The minutes of the meeting of January 5 were read, and after a few minor changes, were unanimously adopted.

The resignations of Dr. Chester W. Emmons, Washington, D. C., and Mrs. R. P. Wodehouse were accepted with regret.

The Corresponding Secretary moved that Dr. G. M. Reed be elected to fill the vacancy on the Bulletin editorial board left by our deceased president, Dr. M. A. Howe. The motion was carried unanimously. The President then brought up the fact that our Local Flora Committee as at present constituted was unwieldly and too specific as to the groups of plants, and asked for a discussion by the Club of this matter. After considerable discussion a motion was passed instructing the President to proceed with a reorganization of the committee as best fitted present circumstances. The President further reported that not all of the standing and other special committees had yet been completed, but would be reported later.

Dr. R. A. Harper, chairman of a special committee on resolutions, then read a resolution commemorating Dr. M. A. Howe, as follows:

The Torrey Botanical Club notes with great sorrow the death of Dr. Marshall Avery Howe on December 24, 1936, at the age of 69 years. Following his election to membership January 12, 1897, Dr. Howe was one of the most active and valuable members of the Club. He was a faithful attendant at the regular meetings and was a leader in all activities having for their aim a more extended knowledge of plant life, as well as the welfare of the Club.

On occasions where careful thought and sound judgment were highly important Dr. Howe could always be depended upon to render effective service. His scientific contributions were of the highest order, many of his papers being sought by the editors for publication in Torreya, the Bulletin and Memoirs.

Dr. Howe served the Club at various times in an official capacity as associate editor, editor of Torreya, editor of the

Bulletin, secretary, vice-president and president, the last office being held at the time of his death. For many years he was the Club's delegate on the council of the New York Academy of Sciences of which he was an honored president for two years. The complete bibliography of his published works and official connections will appear later.

Members of the Torrey Botanical Club mourn the loss of a valued friend and colleague in his passing and wish to record here their deep appreciation of his great service to plant science and their high personal regard for him as an associate and colleague.

It is directed that these resolutions be printed with the minutes of this meeting in Torreya and a copy sent to members of his family.

R. A. Harper
B. O. Dodge
A. H. Graves

The work of this committee was approved and the memorial accepted by a standing vote.

The Corresponding Secretary then presented the applications of Sidney S. Greenfield, 325 Ocean Avenue, Brooklyn, N. Y., C. L. Lundell, Univ. Herbarium, Michigan Univ., Ann Arbor, Mich.; and H. J. Scott, 1110 Hudson St., Hoboken, N. J., for membership. They were unanimously elected. The Corresponding Secretary also announced the action of the Council in approving Prof. Wm. L. Bray of Syracuse University for honorary life membership, and pointed out that Dr. A. J. Grout had been a member since 1897 and was thus in line for honorary life membership. A motion was unanimously passed electing him to this class and instructing the Corresponding Secretary to inform him of this action.

The Scientific Program consisted of an address by Dr. H. K. Svenson of the Brooklyn Botanic Garden on the "Spring Flowers of the Cumberland." His colored lantern slides of these flowers were exceptionally good, and the talk stimulated considerable discussion of the problems of phylogeny, plant migration, and evolution.

D. Elizabeth Marcy
Recording Secretary

Meeting of February 2

The joint meeting of the Torrey Botanical Club and affiliated societies was called to order at Columbia University at 8:15 P.M. by President Barnhart. There were 88 persons present.

Dr. Carl D. La Rue of the University of Michigan gave an address on "Morphogenesis and Plant Tissue Cultures." He reported that mature plants could be grown from small portion of embryos which had not reached full development in the ovary. He indicated that this would be a valuable tool, particularly in the study of morphogenesis and genetics. The lecture was illustrated with lantern slides.

D. Elizabeth Marcy
Recording Secretary

Meeting of February 17

The meeting was called to order at the New York Botanical Garden by the President, Dr. J. H. Barnhart. There were 25 persons present. The minutes of the last two meetings were read and, with a few corrections, approved. Dr. F. T. McLean reported that the auditing committee had gone over the treasurer's books and found them to be correct.

The deaths of Mr. Stephen R. Smith, Dr. Philip Dowell, and Prof. D. S. Johnson, were reported by the secretary. It was agreed that President Barnhart, in writing to Mrs. Johnson, should express the condolences of the club. The secretary reported that letters of resignation had been received from Dr. Kingo Miyabe, and Dr. Vladimir A. Shternov.

In answer to a letter sent to the Governor in regard to the preservation of the beauty of the Palisades, President Barnhart read a reply from Walter T. Brown, Secretary to Governor Lehman, calling attention to Governor Lehman's message to the Legislature of January 6th, in which this matter was discussed.

A petition that the area for Mt. Olympus National Park proposed in the Wallgren Bill H. R. 7086, not be reduced, was read by the President. A motion was carried that this petition be sent to President Roosevelt, Secretary of the Interior Ickes, and Congressman Monrad C. Wallgren. Likewise it was directed

that the secretary send to President Roosevelt, Secretary of the Interior Ickes, Rep. H. L. Englebright of California, Senator Hiram W. Johnson, and to Mr. William G. Schulz, a petition for the preservation of the Sugar Pine Forests just outside Yosemite.

A letter from Dr. A. J. Grout thanking the club for his election to Honorary Life Membership was read.

For the scientific part of the program, Miss Lela V. Barton of the Boyce Thompson Institute talked on "Storage of Seeds." She demonstrated effectively how length of seed viability depended to a large extent upon the method of storage, and that different types of seeds required different storage conditions. The factors, temperature, moisture, and gaseous exchange, were shown to be of prime importance in preserving the life of the embryo, their effects being so inter-related that it was impossible to ascertain the separate influence of each.

The second speaker was Dr. John D. Guthrie, who discussed "Chemical Changes in Plant Tissue in Relation to Respiration and Dormancy." It is possible to break the dormancy of potato tubers by means of various chemicals, principally ethylene chlorhydrin, and potassium thiocyanate. An attempt was made to show how these chemicals brought about chemical changes in the tuber to increase respiration and stimulate growth. It was thought that the increase in glutathione in treated tubers had a direct bearing on this.

After some discussion, the meeting was adjourned.

D. Elizabeth Marcy
Recording Secretary

Meeting of March 2

President Barnhart called the meeting to order at 8:15 p.m. at the American Museum of Natural History. Forty-three members and visitors were present. The following persons were unanimously elected to membership in the Club:

Lawrence M. Ames, Arnold Arboretum, Jamaica Plains, Mass.; Henry N. Andrews, Jr., Washington University, St. Louis, Mo.; Dr. Gladys E. Baker, 29 E. 29th Street, New York City; Prof. Stanley A. Cain, University of Tennessee, Knoxville, Tenn.; John D. Dwyer, 220 Danforth Ave., Jersey City, N. J.;

James L. Edwards, 27 Stanford Place, Montclair, N. J.; Mrs. Helen W. Fields, 72 Rutland Road, Brooklyn, N. Y.; Dr. Edna M. Lind, The University of Sheffield 10, England; Prof. Velma D. Matthews, Coker College, Hartsville, S. C., Prof. William J. Robbins, University of Missouri, Columbia, Mo.

Dr. E. J. Alexander of the New York Botanical Garden gave an interesting account of "Seed Collecting in the Rockies." The expedition had been sent out under the auspices of the New York Botanical Garden for the purpose of collecting seeds of plants suitable for horticultural adaptation. A wide area of the Rocky Mountains was covered, extending from Glacier National Park to central Colorado. Dr. Alexander showed many colored slides of the flora of the alpine and sub alpine regions.

D. Elizabeth Marcy
Recording Secretary

NEWS NOTES

George E. Osterhout, a member of the Torrey Botanical Club for many years, died at Greeley, Colorado, on April second. Born in Tunkhannock, Pennsylvania on March 31, 1858, he graduated from Lafayette College and in 1885 moved to Colorado where he made his home. He opened a lumber office in Windsor, remaining in the lumber business for the rest of his life. He was greatly interested in botany, collecting in his neighborhood and throughout the state and neighboring states. Every year he made at least one collecting trip to a distance. Among the plants he found were many new species, most of which he described in Torreya or the Bulletin of the Club. His herbarium of some 25,000 specimens was said to be the largest personally acquired and privately owned in the west.

White pine blister-rust quarantine regulations were revised this spring by adding Maryland, Ohio, Pennsylvania and Wisconsin to the area previously affected,—the New England states, New York, Michigan, Minnesota and Iowa. In this area the planting and possession of currant and gooseberry plants are prohibited to prevent the introduction of the alternate host of the rust into portions of the states where five-leaved pines are of economic importance.

Okefenokee Wildlife Refuge. This refuge to protect such wild life as the ivory-billed woodpecker, sandhill crane, limpkin or "crying bird," otter, alligator, and other birds and animals has recently been established by the Biological Survey of the U. S. Department of Agriculture, confirmed by an Executive order. The swamp is a wet timbered area with cypress, gum, bay and red maple. There are many marshlike open spaces, called "prairies" and scattered hummocks covered with cypress trees or brush.

The Allegany School of Natural History will open in Allegany State Park in the southwestern part of New York State on July 4 for its 11th season. College credit for courses in field zoology, entomology, botany and nature study is offered. The courses are designed for teachers, camps leaders and naturalists, but provision is also made for research. Information about

the "School in the Forest" can be obtained from Miss Esther W. Eno, the Buffalo Society of Natural Sciences.

The Pennsylvania State College Nature Camp, suspended for the past two years due to the occupancy of the camp site in the Tussey or Seven Sister Mountains by a C.C.C. camp, will be reopened this summer for two three-week sessions. Either of the sessions grants six college credits. Information can be obtained from Professor George R. Green, The Pennsylvania State College, State College, Pa.

Of interest to science and industry is the establishment of Cinchona Products Institute Inc. at 270 Madison Avenue, New York. It will promote and foster medical and industrial research in the use and application of *Cinchona* products, both quinine and the other alkaloids. The director of the Institute is Norman Taylor, formerly of the New York Botanical Garden and Brooklyn Botanic Garden.

Dr. Liberty Hyde Bailey, emeritus professor of agriculture at Cornell University, is in Haiti studying and making collections of palms. As collected by Dr. Bailey the herbarium material of a single species may include a dozen or more pieces of a leaf cut so as to show at least half of a leaf that may be ten feet or more long, flowering and fruiting branches, mature fruit and a section of the trunk.

The Brooklyn Botanic Garden received a gold medal, a special cash prize award of merit from the Garden Club of America at the 24th International Flower Show held in New York from March 15 to 20. The exhibit showed xerophytic plants and their adaptations to meet the desert conditions under which they live.

Dr. William Crocker, director of the Boyce Thompson Institute, has been elected president of the Board of Education of Yonkers.

THE TORREY BOTANICAL CLUB

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their paper appears, will kindly notify the editor, when returning proof.

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Of former volumes, 24–63 can be supplied separately at $6.00 each; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets. Single copies (75 cents) will be furnished only when not breaking complete volumes.

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Volume 18, no. 1, 108 pages, 1931, price $2.00. Volume 18, no. 2, 220 pages, 1932, price $4.00. Volume 18 complete, price $5.00.

(3) Index to American Botanical Literature, reprinted monthly on cards, and furnished to subscribers at three cents a card.

Correspondence relating to the above publications should be addressed to

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BY
GEORGE T. HASTINGS

John Torrey, 1796-1873

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Botanizing in the Shickshock Mountains of Gaspé, Quebec

Raymond H. Torrey

Those who know of the studies of the flora of the Gaspé Peninsula of eastern Quebec by Professor M. L. Fernald, Curator of the Gray Herbarium at Harvard University, during the past thirty years, do not need to be told of its remarkable and significant character. Its species have been listed and their significance as survivals of a pre-glacial flora noted in Professor Fernald's memoir, "Persistence of Plants in Unglaciated Areas, of Boreal America," published by the Gray Herbarium, in 1925, an essential guide to botanists in the region. Inspired by Professor Fernald's work, many professional and amateur botanists have visited Gaspé, and found it extremely interesting. Some of them go in every summer to Mount Albert and Table Top, higher summits of the Shickshock Mountains, in the interior of the peninsula. It is a rugged region, rising to 4,450 feet, with much of it above 2,500 feet, bare of timber, and with scores of snow and ice fields, persisting through the summer, which are survivals of local glaciers which were active not many thousands of years ago.

Three members of the Torrey Botanical Club, Mr. James Murphy, Mr. Louis W. Anderson, and the writer, entered the higher eastern Shickschocks region, in July, 1936, and found the flora novel and interesting and the scenery impressive. There are two ways to enter the region of Mount Albert and Table Top. One is to motor to St. Anne des Monts, on the south shore of the St. Lawrence estuary, about 800 miles from New York City, and hire boats to make the trip up the Riviere de St. Anne, 33 miles, to the Forks, a base camp site for climbs of Albert, to the west and Table Top to the east. The other way is to drive through Maine and New Brunswick to the head of the Bay of

Chaleur, and along its north shore to New Richmond, then up the Grand Cascapedia River. There is a good dirt road for about 30 miles, to the salmon fishing camps along this beautiful stream; then the road grows narrower and rougher and toward its end calls for careful driving. One branch goes to the main workings of the Federal Zinc and Lead Mine, on a summit 2,000 feet above sea, where the caretaker, James McWhirter, is hospitable and often allows small parties to use the cabins as the mine is not now in operation. Another branch, turning left about two miles before reaching the main mines, crosses a ridge and follows up Brandy Brook, to a branch mine working, a total distance of about 50 miles from New Richmond. A third branch turns right, about a mile before reaching the main mine and runs about five miles to Lake St. Anne, head of the St. Anne River.

From the Forks of the St. Anne, trails ascend Mount Albert and Table Top. Prof. Fernald's parties made their working base at a little lake, on the west side of Table Top. since called "Lac aux Americains," after the Harvard botanical party. The highest summit of the Table Top plateau, 4,450 feet, is called, on some maps, "Botanist's Dome," although, on the Quebec Forest Service maps, it is called "Mount Jacques Cartier," after the French discoverer of Gaspé.

The quickest way to get to Mount Albert is to follow the gravel and dirt road, from New Richmond, up the Cascapedia, taking the left turn, to the mine in Brandy Brook. Thence a wagon road may be followed on foot about five miles to the head of the brook, and over a pass, where it ends. From that point a narrow trail which seems, from the tracks, to be kept open largely by moose and bear, follows down a brook which enters the Isabelle River along the south side of Mount Albert. Good tent camp sites are found along the Isabelle.

Another way in to the mountains would be to follow the road from New Richmond, turning right, before reaching the main mine, to Lake St. Anne, where cars could be parked. From the outlet of the lake a trail runs along the stream to the Forks, where the trails to Albert and Table Top turn west and east.

On our drive in from New Richmond, we began to find interesting plants along the banks of the road, and after we left the car, on the wagon road up Brandy Brook. The banks were

covered with dense colonies of lichens, especially of the genus Cladonia, of which the following have been determined, with the aid of Dr. A. W. Evans, of Yale University.

Cladonia cenotea, f. *crossota; C. cornuta*, ff. *scyphora* and *cylindrida*, with tall slender podetia; *C. cornutoradiata*, resembling *cornuta*, but branching; *C. deformis*, mostly f. *crenulata*, very robust and handsome; *C. gracilis*, var. *dilatata*, uncommonly robust; *C. major*, with large cups; *C. cristatella*, f. *Beauvoisii*, our familiar red-crested Cladonia, but much taller and larger-fruited than in the club range; *C. digitata*, f. *monstrosa*, a form with large, irregularly-branched cups and large, flat, scarlet apothecia. Other Cladoniae whiich occur in the club range, but are usually more robust in Gaspe, were: *C. chlorophaea*, *coniocraea*, ff. *ceratodes*, *truncata* and *pycnotheliza; squamosa*, f. *levicoticata*, mm. *pseudocrispata* and *rigida; rangiferina*, *alpestris*, *mitis*, *ochlochlora*, *nemoxyna*, and *multiformis*, f. *Finkii*. A little *C. botrytis*, a rare species, was found, but closer search should yield more of this, now recorded from Gaspé, Mount Marcy and British Columbia, and a very few other places in North America.

Growing over banks of *Hylocomnium proliferum*, which is the common moss of the forest at 2,000–2,500 feet, were large colonies of a beautiful grayish-green foliose lichen, somewhat resembling *Peltigera*, but which Mrs. Gladys P. Anderson named for us as *Nephroma arcticum*, a northern species.

After passing over the height of land and descending toward the Isabelle, we began to get views of the upper levels of Mount Albert, steep and imposing, and, to our surprise, with frequent snowfields at the heads of brook gullies. The black humus of the trail was trodden with moose hoofprints, and in places not cut up by the moose, we saw the footprints of bear in the mud. These large animals, together with caribou, must be common, from their tracks, but we saw none of them on our three days in the woods, nor did we hear any sound of them during the night, in our tent along the brook.

Next morning, a fine sunny day, (the temperature fell to 50° during the night but rose to above 70° in the afternoon) we started for the table land of Mount Albert. We had been crossing the limy shales and sandstones which prevail in the region, and which sometimes display plant fossils, casts of a Lepido-

dendron. Then we passed a belt of granite, and after crossing the Isabelle and starting to climb up a brook whose branches came from four snowfields, just below the rim of the summit, we entered a zone of reddish, greasy looking amphibolite, which encircles Albert, as may be noted on the Mount Albert map of the Canadian Geological Survey, the best large scale map for the mountain and its immediate surroundings. Soon we began to see new plants. First was the brilliant purple *Lychnis alpina* (*Viscaria alpina*, Britton & Brown), occurring in Newfoundland and Labrador, with its southernmost station on Mount Albert. A little farther up the brook we came upon beds of the alpine form of the Maidenhair Fern, *Adiantum pedatum*, var. *aleuticum*, obviously a Maidenhair, but differing distinctly from the common form of our club range in its stiffer, more upright, less crescentic fronds. This is one of the plants which Prof. Fernald cites as evidence that much of the flora of eastern Gaspé is made up of survivals from pre-glacial times, which persisted here, because, as Prof. A. P. Coleman,* demonstrates, the Labrador ice sheets did not cover this region, nor, as Prof. Fernald says, destroy pre-glacial flora, as they did to the westward and southwestward, in their advance south to the latitude of New York. I had read of this plant and its significance in its isolated stands in eastern North America, in Gaspé, in the Megantic Mountains of southern Quebec, and in Bruce Peninsula in Ontario; separated by almost 2,000 miles from stations in western unglaciated regions in the Sierras of northern California, Oregon, Washington, British Columbia and Alaska, including the Aleutian Islands, from which it was first noted by Ruprecht, and for which its varietal name is given. But it was delightful to find it, first at about 2,300 feet, then everywhere higher up to the topmost parts of the open slopes and table land, to 3,560 feet.

Farther up the brook, we came on another of the boreal flowering plants, which find their southernmost stations on Mount Albert. This was a strange looking thing, with linear, grass-like leaves, and hemispherical heads of lilac-tinted flowers, with scarious calyx tips. It suggested some form of *Allium*, but was obviously not liliaceous. We could not find it in our pocket

* Bulletin No. 34, of the Canadian Department of Mines, "Physiography and Glacial Geology of Gaspé Peninsula, Quebec."

Gray, nor, when we got back home, in Britton & Brown. So we sent a photograph by Louis Anderson, to Prof. Fernald, who kindly named it as *Statice labradorica*, var. *submutica*, a member of the *Plumbaginaceae*. Prof Fernald referred me to the description of the species of this genus in America by S. F. Blake in Rhodora for January, 1917, years after the publication of our standard manuals on eastern flora, in which he names this form on Mount Albert as a new variety, *submutica*.

Near the contact of the red amphibolite and the greenish serpentized peridotite, which makes up the central bulk of Mount Albert, along the first two branches of the brook, we found another rarity, a stiff little fern, whose affinity with *Pellaea* or *Cryptogramma* was evident. It proved to be what Gray called *Cryptogramma densa*, although Fernald lists it in his memoir as *Pellaea densa*. Again, it occurs only in Gaspé and the Bruce Peninsula in the east, though found in many stations in the mountains of the northwestern United States and western Canada. It is another of the key plants, according to Dr. Fernald, indicating persistence of pre-glacial flora in spots that escaped the great glaciations.

Getting above the spruce and fir, and out upon the open slopes of thin sod and open gravel, we came on some plants known to us from alpine summits such as Mount Washington and Mount Katahdin; heaths such as *Ledum groenlandicum*, *Phyllodoce caerulea*, *Empetrum nigrum*, *Loiseleuria procumbens*, and *Cassiope hypnoides*. A mountain sandwort, something like *Arenaria groenlandica* of farther south, proved, from Dr. Fernald's determination, to be *A. marcescens*. The beautiful low Moss Campion, *Silene acaulis*, is common above 2,500 feet on Albert, but we were late for its best blooming, finding flowers only on plants near the summit. On the table land, slanting from the highest point at the south end, toward the abrupt walls of the valley of the Riviere du Diable ("Devil's Gulch"), we found larger ice fields than those on the southern slopes. One was several acres in extent, melting around its edges, with icy rills entering a tiny lake bordered by a meadow. Around the edge of the ice, little willows, probably *Salix brachycarpa*, from Prof. Fernald's lists, were just coming into bloom, with the pollen bright yellow on the tiny, silvery haired catkins. Summer comes late and last but a few weeks about these ice fields; the

conditions, as Prof. Fernald points out, are quite like those of northern Labrador and south Greenland.

Lichens were not as numerous and robust on this exposed table land as I expected. *Cladonia alpestris* occurred but in small, narrow heads, much smaller than at lower altitudes along the mine road. *Cetraria islandica*, though common, was shorter, more stunted looking, than on high summits in the White Mountains, Green Mountains or Adirondacks, or even in the Palisades Interstate Park. We considered two theories to account for this: one, that the lichens are uncovered so short a time that they do not reach the more robust sizes of less bleak locations; another, that the caribou browse on them, for in winter, when the forest below 2,500 feet is covered five feet deep in snow, the summit of Albert is relatively bare, owing to the high winds which blow much of the snow off the table land, into great banks below. The caribou then betake themselves to the summit where they can plough through the snow with their frontal horns to find sufficient forage.

We did find one uncommon Cladonia, just a small colony, near the biggest of the ice fields, at about 3,300 feet. Dr. Evans identified it as *C. lepidota* (Sandst.) or *C. lepidota*, var. *gracilescens*, (Du Rietz). It seems to have affinities, in the form of its podetia and cups, with *C. degenerans*, of rather more southern latitudes, and somewhat more remotely, with *C. verticillata*, common in our club range. Sandstede records it from such northern latitudes as Nova Zembla, and Mrs. Joyce Hedrick Jones found it on Unalaska Island, Alaska, last summer. (Mich. Acad. 1936, p. 77.)

Much of the sod on the top of the mountain and fillings of crevices in the raggedly eroded peridotite, worn into strange shapes by millions of years or pre-glacial erosion, without the smoothing by ice sheets which we are accustomed to see in the northern parts of our club range, is made up of a moss new to us, with whitish leaf tips, which Dr. A. J. Grout named as *Rhacomitrium lanuginosum*.

Another odd looking flowering plant, found all the way up the mountain, was a pale, greenish-yellow form of the Painted Cup, *Castilleja pallida*, var. *septentrionalis*, ranging from Labrador and Newfoundland, to the high mountains of New England, and to Minnesota and the Black Hills of South Da-

kota. Its generic likeness to our scarlet-flowered *C. coccinea* was evident.

A pink-disked crustose lichen, growing on sod, was named for us by Mrs. Anderson as *Biatorella fossarum*. Dark forms of *Rhizocarpon* were the prevailing crustose lichens on the rocks; strangely, we did not see the lemon yellow *R. geographicum*, common on summit ledges on Katahdin, Washington, Mansfield, Marcy and MacIntyre. But the crustose lichens should have Mrs. Anderson's full attention for a couple of days.

On the trail, going back to our car, we were delighted with the beauty of the great Ostrich Ferns, not so common in our club range, but in these Gaspé forests, at 1,500 to 2,500 feet, as prevailing as the Cinnamon Fern is with us in New York.

We recommend one thing as essential to enjoyment of botanizing in comfort in this region,—an ample supply of "fly dope," to keep off black flies, "punkies" or "no see ums," and mosquitoes, in that order of virulence. We used a preparation called "Lollycapop," which was effective as long as it lasted, but for three men for three days, one box wasn't anything like enough. We recommend one box for two days for one person, also that one should not wash or shave, but plaster the grease on and let it make an impervious enamel.

The Shickshocks would make a richly rewarding objective for other members of the Torrey Botanical Club. Such a trip would take some grit and endurance, a lot of hiking and climbing, good nature over petty irritations, and plenty of "fly dope." We believe that early July, about a week earlier than our visit say July 4–20, would be best for prime flowering conditions.

Hollis, L.I., N.Y.

A new plant joins the Hudson River flora

Homer D. House

On September 2, 1929, Mr. William H. Barker, of the State Education Department, whose home is along side of the Hudson River at Waterford above Albany, brought to me specimens of a plant, which at first, because I had never seen the species before, looked strange. Examination of the flowers and fruit and reference to the herbarium soon disclosed the fact that it was *Nymphoides nymphaeoides* (L.) Britton[1] (*N. peltatum* S. P. Gmel Britten & Rendle). Mr. Barker told me that he had found the plants, quite a colony of them in fact, growing in the shallow water of the Hudson river near his home. The accompanying photography was made from these specimens.

Already two brilliantly flowered plants, unknown along the Hudson river half a century ago, have taken almost complete possession of the marshy environs of the river banks and backwaters from above Troy to New York. They are the Great Hairy Willow-herb (*Epilobium hirsutum* L.) an ally of our common upland fireweed, and the Purple Loosestrife (*Lythrum salicaria* L.) The usurpation of a dominant place in marshes and stream borders by these two species, now well extended across the state, outside of the higher mountains has apparently brought no protest.

In 1932, the Floating Heart, the common name ascribed to *Nymphoides nymphaeoides*, was collected by Muenscher and Maguire below Schuylerville, and is reported from there by Muenscher.[2] On August 26, 1936, I motored over a dirt road along the east side of the Hudson river (in Washington county) between Stillwater and Schuylerville. In quiet backwaters of the river I was astonished to see wide stretching colonies of a plant so thickly covered with yellow flowers as to appear almost solidly yellow from the highway and forming a brilliant contrast against the varying shades of green of the paralleling zones of vegetation and adjacent woodlands. My first thought was

[1] Britton & Brown. Illustrated Flora 3: 19. 1913.

[2] Muenscher, W. C. Aquatic Vegetation of the Mohawk Watershed. In A Biological Survey of the Mohawk-Hudson Watershed (Biological Survey No. IX). Supplemental to the 24th Annual Report of the New York State Conservation Commission. p. 248. 1935.

"*Bidens Beckii*" but closer examination revealed that the former scattered growths of Floating Heart were now extensive, solidly massed colonies, almost comparable in density to the growth of Trapa natans in the Mohawk river, described by Muenscher.[3] Nearly every quiet bay and backwater between Troy and Schuylerville is now occupied by this species, as well as occasional shallow bars in the main stream itself. Only when

Photo by E. J. Stein

The Floating Heart. Nymphoides nymphaeoides. From the Hudson River at Waterford, New York, collected by William H. Barker.

it is in full bloom in August can its relative abundance and beauty be appreciated.

Its origin here is unknown, but it is probably an escape from some artificial or natural water garden or pool, in which situations it is not infrequently seen in cultivation.

The three species mentioned in this paper have profoundly altered the appearance of the upper stretches of the Hudson river vegetation, just as at a much earlier time, the White Daisy, the Black-eyed Susan, Buttercup, Queen Anne's lace and other so-called weeds had altered the flora of our upland fields and meadows. The Floating Heart was collected at Nutten

[3] Muenscher, W. C., l.c. 230, 234–242. f. 1–5. 1935.

Hook, Columbia county, on September 13, 1936, by Dr. Rogers McVaugh, indicating that the plant is possibly on its way down the river. In this respect it differs from *Trapa natans*, unbelievably common in the Crescent section of the Mohawk river above Cohoes, but which has as yet not advanced down the river.

What will be the next recruit to the flora of the Hudson river? One good guess is *Butomus umbellatus* L., which has reached the southern end of Lake Champlain, where collected by Knowlton,[4] by Muenscher,[5] and by Frank Dobbin (August 4, 1930).

New York State Museum
Albany, N.Y.

[4] C. H. Knowlton. Rhodora 32: 18. 1930.
[5] Muenscher. W. C.. Rhodora 32: 19. 1930.

Plant records from southwestern New York—II[1]

Irving William Knobloch

During the course of the past year, I have had an opportunity to further study the plants of the southwestern part of the state, particularly those of Cattaraugus and Chautauqua counties. Aside from the "Flora of the Allegany State Park Region" by Homer D. House and William P. Alexander, little has been published on the local plants. My first study of the local flora was published in Torreya 36, 1: 1–2, February, 1936. Species not previously recorded for this area:

Galinsoga parviflora Cav.

This adventive member of the compositae was noticed in waste places in the city of Salamanca, N. Y. during November, 1936.

Aster Lowrieanus Porter

This beautiful aster was seen rather frequently in open woods in the Allegany State Park, particularly in the part adjacent to the C.C.C. camp No. 51. Collected on Sept. 24, 1936.

Aster caesia L.

This species was found on the same day in the same places as the previously mentioned aster.

Potamogeton panormitanus Biv.

I located this species in the Allegheny river south of Red House, N. Y. on Oct. 7, 1936. Dr. Fernald first recorded this species as distinct from *P. pusillus* in this country. (Fernald, M. L. The Linear-leaved Species of *Potamogeton*. Memoir American Academy of Science 17: Pt. 1, 183 pgs., 1932) *P. pusillus* was collected by Dr. Gordon in Stillson's pond near E. Randolph, N. Y. in 1932.

New stations for previously recorded or collected species:

Potamogeton foliosus Raf.

Located in 1934 in the Allegheny river near Quaker Bridge, N. Y. by Dr. Robert Gordon. I found this species in a stagnant pool at the state fish hatchery near E. Randolph, N. Y. on July 20, 1936.

[1] Part I was printed in Torreya, Vol. 36, No. 1, Jan.–Feb., 1936.

Potamogeton epihydrus Raf.

Previously located in Stillson's pond and in Tunungwant creek by Prof. W. P. Alexander. My specimens were collected in the Allegheny river south of Red House, N. Y. in Aug. 1936.

Potamogeton crispus L.

This European species was collected by Dr. Gordon and W. P. Alexander in the Allegheny river near Quaker bridge in 1934. I collected it from a stagnant pool in a gravel pit between Red House and Cold Spring, N. Y. on Nov. 8, 1936.

Potamogeton amplifolius Tuckerm.

This is the first apparent record from Chautauqua county, having been found there in Mud lake near Forestville, N. Y. on June 14, 1936.

Potamogeton Robbinsii Oakes.

This also seems to be the first record for Chautauqua county. I gathered it at the same time and in the same lake as recorded for *P. amplifolius*.

Aster sagittifolius Wedemeyer

This aster is of rare occurrence in the Allegany State Park region having only been located by House and Alexander near Elko and in woods in Sunfish run, both localities outside the park boundaries. I found the species to be not uncommon in dry, scrubby woods and fields on the Allegheny Indian reservation near Red House, N. Y. on Sept. 24, 1936.

I wish to acknowledge the determinations of the above species by thanking Mr. S. F. Blake and Dr. W. C. Muenscher.

Allegany State Park
Red House, N.Y.

Posidonia oceanica found in North America

E. J. Alexander

One of the most interesting botanical finds in recent years was made on May first by Robert Runyon of Brownsville, Texas, when he picked up among sea-wrack thrown up on the coast near the mouth of the Rio Grande in Texas several pieces of *Posidonia oceanica* (L.) Delile, previously known only from the Mediterranean Sea and off the Atlantic coast of the Iberian peninsula. The specimens are of stem-fragments with leaves starting into spring growth, and since, when found, the leaves were pale green, it seems likely that the plants were torn loose somewhere near the North American coast.

This plant, related to the eel-grass, *Zostera marina*, is one of a small number of flowering plants which inhabit the sea, and the least seen of them, for it is supposed to inhabit deeper waters than the rest, but there seems no record of its having been found in situ, so that its habitat and manner of growth is not certainly known.

Mr. Runyon's specimens are of branching portions of semi-succulent stems, some of which are six to ten inches long, and would seem to indicate that the plant has a shrub-like form of growth. It is hoped that more material may be found in the future, especially in flower or fruit, that we may certainly know if it be truly the Mediterranean species, since no other conclusion seems possible from the material found.

New York Botanical Garden

Local flora notes

Under this head TORREYA would like to publish from time to time notes on the occurrence of uncommon plants in our area, notes on new stations for the rarer plants, or comments on anything of interest regarding our local plants. This will be in addition to the reports of field trips. The following notes are sent by Mr. Leon W. Bowen of Bloomfield, N. J.

Equisetum scirpoides; found growing luxuriantly near the mouth of Pine Meadow Brook, Interstate Park, Rockland County, N. Y. in March, 1937. Specimens were sent to the Brooklyn and Bronx Botanical Gardens.

Lycopodium annotinum; along the outlet of Green Pound, Morris County, N. J. in 1931. On Wawayanda plateau, Sussex County, N. J. in 1935.

Lycopodium tristachyum; at Green Pond, Morris County and two stations on the Wawayanda plateau, Sussex County in 1931. Since then Mr. J. L. Edwards has found four more stations in the same general region in Passaic and Sussex Counties.

Woodwardia areolata; on Beaufort Mountains in Orange County and in Passaic County in 1926. On Kittatiny Mountains in Sussex County in 1933. On Ramapo Mountains, Bergen County in 1935.

Of these the first is not given in Small's *Ferns of the Vicinity of New York*, the second is said to be very rare outside of the Catskill and Pocono plateaus, the third is probably frequently confused with the more common *Lycopodium flabelliforme*, and the last is a costal form.

FIELD TRIPS OF THE CLUB

Week end at Branchville, N. J., May 21 to 23

This twelfth nature outing at Branchville was attended by over one hundred members and friends of the club. On Friday evening the group assembled in the recreation hall of The Pines to listen to Dr. Henry B. Kummel, Director of the Department of Conservation and Development of New Jersey, describe the geological formations of north-western New Jersey, from the Pre-Cambrian of at least 700,000,000 years ago down to the glacial deposits of the Quaternary of less than 35,000 years ago. Mr. H. Harmsted Chubb, of the American Museum of Natural History, showed a beautiful series of plant and bird pictures from the Catskill Mountains, describing intimate details of the lives of the birds shown. Saturday morning most of the group were up at five thirty to go on the bird trips led by Mr. and Mrs. Chubb and Mr. Evans. Other bird trips were taken during the day Saturday and on Sunday morning. A total of over eighty species were seen. For the second year in succession a nest of the American Bittern was found at the edge of the swampy area below the ridge on which The Pines is located. On the bird trip to Culver Lake Sunday morning the party saw close together Wilson's, Wood, Olive-backed, and Grey-cheeked Thrushes and the two water thrushes, while at another point all of our swallows—Barn, Eve, Rough-winged, Bank and Tree—were seen. Geological trips were led by Dr. Kummel on Saturday and Sunday, the last to High Point where in panorama the mountain ridges and valleys are shown for many miles and much of the geological history of the region can be visualized.

Dr. Forman T. McLean of the New York Botanical Garden led trips for the study of trees and flowering plants, and Mr. George T. Hastings, trips for flowers and general nature study. Saturday evening Dr. McLean showed a large number of colored slides of our local trees, describing them and their relationships. Mr. Hastings outlined the life of Linnaeus, an appropriate subject, as Sunday was the 230th anniversary of the birth of the first great botanist and the day on which thousands of his enthusiastic followers for years made botanical excursions in his memory.

Mrs. Cora R. Smith and Mr. W. H. Husk had arranged to make all of the party comfortable at The Pines, though owing to the large number the "annex" had to be opened and a few late registrants quartered in the village about a mile away. The woods about the inn were beautiful as always, masses of columbine still in blossom, the yellow lady's slippers in full bloom and a few flowers on the purple clematis (*Clematis verticillaris*), while the limestone loving ferns—walking, wall rue, cliff brake, maidenhair spleenwort were in the crevices where the members of other outings had learned to look for them.

George T. Hastings

Trip of May 31 to Branchville, Conn.

The most interesting novelty found on the field trip on May 31, 1937, at Branchville, Conn., led by Miss Eleanor Friend, was the Featherfoil, or Water Violet, *Hottonia inflata*, found in a new station for Connecticut, and for the range of the Club, in Weir's Pond, near the border of Ridgefield and Wilton, south of Branchville. Mr. E. B. Harger, President of the Connecticut Botanical Society, who was in the party, said that it was the third station reported in Connecticut, the others being in the vicinity of New Haven. Norman Taylor, in his *Flora of the Vicinity of New York*, New York Botanical Garden, 1915, records it as local in the coastal region of our area, and in Bergen and Hudson Counties, N. J. One of the Bergen County stations was, I think, in the swamp near Moonachie, where *Magnolia virginiana*, *Rhododendron maximum* and *Chamaecyparis thyoides* still persist, though threatened with extermination.

The colony in Weir's Pond is fairly numerous, about thirty plants in various stages of development being counted, near the dam at the north end, and in shallow water on the east side. There may be more in waters toward the center of the pond. A few were found in bloom, and specimens were sent to the New York and Brooklyn Botanic Botanical Gardens, on behalf of the local flora committee of the club.

I have not read any account of the mechanics of this interesting aquatic member of the *Primulaceae*, but it apparently shares the habit of some other aquatic plants, like the Bladderworts, in having a winter resting stage, on the bottom of quiet waters, and, when spring comes, the flower stem develops, and extends, its hollow, inflated character supplying a buoy which

raises the flowers a few inches above the surface of the water when they are ready to bloom.

It comes into bloom in late May, and continues in bloom until August. We saw a number of plants resting on the bottom in a foot of water with the flower stalks just beginning to arise from the rooting stem. These stalks were only an inch or so high and at that stage apparently not enough buoyancy had developed to raise the plant to the surface. But, as the flowers form and the buds appear, the inflated stem extends to several inches in length, and its air chambers together with some probable degree of lifting power furnished by the finely dissected leaves, developing anew for the season bring the stems, with the interrupted raceme, of whitish, five-parted flowers, whorled at the contracted joints, to a floating condition in which the buds are exposed to the air and open. After the seeds are ripened, toward autumn, the whole plant, which floats loosely about in the water, sinks to the bottom for the winter.

Ricciocarpus natans, one of our floating hepatics was also found in Weir's Pond. A plant new to most of us, was *Lysimachia* (*Naumburgia*) *thyrsiflora*, the Tufted Loosestrife, which was apparently well established and blooming thriftily in a water garden of wild plants on the grounds of Mr. Morehouse, in Branchville. Mr. Harger said it is not common in Connecticut and Taylor records it as local and scattered in our club range.

Raymond H. Torrey

Trip of June 6 to the Hills South of Chester, Orange County, New York

Due to threatening weather and the fact that this year happened to be an unusually good one for wild strawberries, our party did not climb beyond the lowermost ridges of Sugarloaf Mountain, but spent time on Durland Hill, which lies between Sugarload and the town of Chester. While not affording the magnificent view to be seen from all sides of Sugarloaf, this hill (about 850 feet high) appears to be much richer in plants, and, like Sugarloaf, is composed of slaty rocks, which foster a strikingly different flora from that of the crystalline Ramapo Mountains to the eastward. The slopes of Durland Hill are heavily wooded with oaks and hickories, providing a good display of *Hepatica* in early spring. The chief plant of interest in the ascent from the southeast is the excessively rare *Lespedeza Brittonii*,

not in bloom at the time of our visit. Our attention was soon drawn to several trees of slippery elm (*Ulmus fulva*) and a few clumps of horse gentian (*Triosteum aurantiacum*) which grows in rank profusion farther up toward the open summit. As one approaches the summit, open shale ledges are of great interest. Here are several ferns: *Asplenium platyneuron*, *Cystopteris fragilis*, *Woodsia obtusa* and *Woodsia ilvensis*, the last-named species appearing also in exceptional abundance on shaded ledges at the western part of the summit. Flowers of a form of *Cerastium arvense* with very narrow leaves, which I had mistaken previously for *Phlox subulata*, dotted the crevices of the exposed rocks. With a little hunting, we found basal leaves of *Ranunculus fascicularis*, accompanied by the swollen fascicled roots below. Here were also *Arabis lyrata* and *laevigata*, the shrub-like *Celtis occidentalis* var. *pumila*, *Geranium carolinianum* var. *confertiflorum* Fernald, *Myosotis virginiana*, *Pentstemon hirsutus*, and *Cardamine parviflora*. In loamy borders appeared, to our great surprise, mats of *Oxalis violacea*, still with traces of flowering heads, and easily recognized by the bulbous rootstocks. Here and there were clumps of dwarf oak (*Quercus prinoides*) which one associates with the pine barrens of Long Island. The sedges to be expected in such a locality—*Carex cephalophora*, *C. Muhlenbergii* var. *enervis*, *C. pennsylvania*, *C. convoluta*—were abundant; *C. umbellata*, common on the summit of Sugarloaf, seemed to be lacking. Clumps of the handsome bronzed and somewhat-nodding inflorescences of *Carex Bicknellii* occur abundantly on the open summits, and a little later in the season, buffalo grass (*Bouteloua curtipendula*) and the comparatively rare *Panicum philadelphicum* are to be found on the exposed ledges. *Polygonatum biflorum* grows well on sunny ledges and was just coming into flower at this date whereas *P. pubescens*, mostly confined to shaded woods, was in full bloom two weeks earlier. A thicket of *Viburnum affine* var. *hypomalacum* (*V. pubescens* of Gray's Manual) mingled with *Cornus paniculata*, fringes the summit, the open area being covered largely by *Potentilla arguta*, species of *Andropogon*, and isolated patches of *Quercus ilicifolia* and *Vaccinium stamineum*. Our descent of the hill was impeded by strawberries, and the forthcoming attack on Sugarloaf was halted by a downpour which turned back even the most valiant members.

H. K. Svenson

NEWS NOTES

Proposed Green Mountain National Park

The State Planning Board of Vermont has proposed making part of the Green Mountains, including some 124,000 acres, a national park. The area would take in the Lion (Camel's Hump Mountain), Mount Mansfield, the highest point in the state and some eight other high peaks. The area is divided into two sections by the Winooski Valley, but a proposed parkway would be included in the park, connecting the two sections along the western border and affording fine vistas of the mountains. The plans are to have no roads built in the park, but through the new parkway and the improvement of existing roads to make access to the trails and bridle paths easy. The area is of great geologic interest, through it running the core of the Appalachian system of mountains. It is of especial interest botanically with hardwood and coniferous forests with characteristis floras and an extreme range of botanical formations. The plans call for the acquisition of the land by the state of Vermont (two small state forests in the area are already state property) and deeding it to the United States in the same way that Virginia gave the land for the Shenandoah National Park and Tennessee and North Carolina that for the Great Smoky Mountains National Park.

The Botanical Society of America and the American Society of Plant Taxonomists will hold summer field meetings from August 18 to 21 at Acadia University, Wolfville, N. S. and from August 24 to 27 at the University of Michigan Biological Station at Douglas Lake, Michigan.

Dr. John Moore Reade, professor of botany since 1908 and from 1919 to 1926 director of the biological laboratories at the University of Georgia, died on May 8 at the age of sixty-one years.

The world's largest flower. From June 1 to 11 there was in bloom in the greenhouse of the New York Botanical garden the first specimen of *Amorphophallus titanum* ever to flower in America. In shape something like a calla lily, this member of the arum family was over eight feet from the bottom of the

spathe to the top of the spadix. The spathe was about four feet in diameter, chocolate color inside, mottled green on the outside, a flaring funnel, from the center of which stood up the pale yellow spadix. During the time it was in blossom the greenhouses were closed to the public, but hundreds of visitors, attracted by the articles in the daily papers, crowded around to view it from outside. The Krubi is a native of Sumatra and is said to have blossomed only five times before away from its native home.

Pére Artheme Dutilly, of the Oblate Mission, after four years spent along the northern shores of Canada, Labrador, Baffin Land and up the Mackenzie and Great Slave rivers, "came out" to work over his collections of plants last winter and spring at the Catholic University of America in Washington. He has now gone back to the region about the north end of Hudson Bay for further study of the plant life. He plans a book on the ecology of plants of the Arctic. Among the interesting things he has noted is that arctic plants tend to be purple rather than green and that the depth of the purple color seems to increase the further north the plants grow. (Science)

Dr. Elmer D. Merrill of Harvard University has been elected president of the Executive Committee of the International Union of Biological Sciences, succeeding Sir Albert Seward, Professor of Botany at Cambridge University.

Dr. Ulysses P. Hedrick, director of the New York State Agricultural Experiment Station at Geneva, N. Y., has resigned, the resignation to take effect on his sixty-eighth birthday next January 15. He has been a member of the station staff for more than thirty years and director since 1928.

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John Torrey, 1796-1873

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TORREYA

Vol. 37 September-October, 1937 No. 5

Some local names of plants—VI*

W. L. McAtee

The writer esteems it a satisfaction and a privilege to be enabled again to contribute material toward a glossary of American plant names. Ever in search of bird appellations, his net is out also for unusual plant designations and those included in the present installment come from a wide variety of sources that are indicated in the text except in the case of names personally gleaned.

Examination of papers of Dr. B. S. Barton in the library of the Pennsylvania Historical Society revealed that he made a point of collecting local names of plants, and suggested that his principal botanical works, now rather rare, would be good sources of material in this field, a point that was verified by consultation of a set of his publications in the Library of the American Philosophical Society. Names from the Barton Journal additional to those in Lyon's valuable compilation (Plant Names, 1907) are here included and designated by the surname (Barton) in parentheses.

Scattered vernaculars from old books that touch upon natural history also are given. Such works are sources of some of the most interesting items. Some of the writers, considering the state of information in their time, dealt rather fully with plants and the names they used must be considered as the foundation of American vernacular plant nomenclature. Among such writings the following are exceptional for their periods: William Wood, New England's Prospect, 1634; Bernard Romans, A concise natural history of east and west Florida, 1775; and John Lee Williams, A view of west Florida, 1827.

The names used in localities where the colonizing stock has persisted down to our time have an interest of their own, and a

* All of this series have been published in Torreya, No. 1 in Vol. **13**: 225–236, 1913; No. 2, **16**: 235–242, 1916; No. 3, **20**: 17–27, 1920; No. 4, **26**: 1–10, 1926; and No. 5, **33**: 81–86, 1933.

number of them have been recorded in previous articles of this series, particularly cognomens of French derivation prevalent in Acadian Louisiana. Recently there has been published a study of "The survival of French in the old District of Sainte Genevieve" [Missouri] (Univ. Mo. Studies, 10(2), April 1935) by W. A. Dorrance. The specifically identifiable plant names from that work are here reproduced and indicated by (Dorrance) in parentheses.

In a previous installment (III, 1920, p. 17), I pointed out how near Linnaeus came to monopolizing the naming of our common plants; the proportion for specific groups at the former reference was 52 out of 95, and in the present case, 51 out of 72. All of the names in this contribution are indexed for convenient use, especially in connection with other glossaries.

Ulvaceae

1. *Ulva* and *Enteromorpha*.—Brant salad, coast of Virginia and North Carolina (C. Cottam).

Pinaceae

2. *Taxodium* spp.—Swamp cedar, Southern States.
3. *Abies Fraseri* Pursh.—The local name here mentioned is on record but a little discussion may be clarifying. Years ago in North Carolina I was told about the lash-horn or lash-horn tree as being peculiar to the high mountains, the vicinity of White-top Mountain on the N. Car.–Va. line being specifically mentioned. No more light came on this term until I encountered accidentally, in an article on birds (Rives, W. C., The Auk, 6(1), Jan. 1889, p. 51), this statement about White-top Mountain: "the extreme summit is covered with a species of balsam known locally as the lash-horn." Lyon's index (Plant Names, 1907) calls for "lashhorn" in connection with *Picea mariana* but it is not given in the text and this assignment of the name would seem to be an error. Sudworth (Check List, (1927) gives "Lashorn balsam spruce" for *A. Fraseri*, evidently a combination vernacular and book name. I believe the indigenous term is as given above by the writer and by Rives. Local investigation as to its meaning would be of interest.

EPHEDRACEAE

4. *Ephedra* spp.—Brigham's tea, clapweed, southern Utah and Nevada (Ray Chandler); most of the vernacular names known for these plants (see Lyon's Plant Names, 1907, p. 177; Wooton and Standley, Flora of N. Mex., 1915, p. 38) refer to a supposed value for the treatment of venereal diseases.

TYPHACEAE

5. *Typha latifolia* L.—Queue de rat, Louisiana (Dorrance).

POTAMOGETONACEAE

6. *Potamogeton praelongus* Wulfen.—Muskie (i.e. muskellunge) weed, Wisconsin (John H. Steenis).
7. *Ruppia maritima* L.—Duck grass, coast of Virginia (C. Cottam).
8. *Zostera marina* L.—Sea-oar, coast of Maryland, Virginia, and North Carolina (C. Cottam).

ALISMACEAE

9. *Echinodorus* sp.—Bean-leaved wampee, Combahee River, S. Car. (L. A. Beckman).

GRAMINEAE

10. *Setaria italica* L.—Quail's-delight, Hilton Head Id., S. Car.
11. *Leersia oryzoides* L.—Cut-grass, Charleston, W. Va. (Barton).
12. *Spartina alterniflora* Loiseleur.—Cow-grass (William Vogt, Delaware Sportsman, 2(2), Oct. 1936, p. 9).
13. *Spartina patens* Aiton.—Bent hay, Delaware (C. Cottam).
14. *Phragmites communis* Trinius.—Foxtail (William Vogt, Delaware Sportsman, 2(2), Oct. 1936, p. 9).

CYPERACEAE

15. *Scirpus validus* Vahl.—A note by J. G. Cooper on the common western name of this plant is of interest. He says, it "should be printed tulé, it being the Spanish or Mexican name of the giant rush . . . . In Utah it is spelled Tooele, the lake thus named being within the range of Spanish travel, but should be pronounced too-ly in two syllables" (The Auk, 3(1), Jan. 1886, p. 124).

16. *Rynchospora corniculata* Lamarck.—Spile-[spoil-] market, Ritter, S. Car.; from the effect of the presence of its akenes in reducing the grade of rice; a name persisting from the now rather remote days of rice farming.

ARACEAE

17. *Acorus Calamus* L.—Belle-angélique, swamp-root, wild flag, wild iris, Missouri (Dorrance).

ERIOCAULACEAE

18. *Eriocaulon* spp.—Hatpins, eastern North Carolina (A. C. Martin).

BROMELIACEAE

19. *Dendropogon usneoides* L.—Barbe espagnole, Louisiana and Missouri (Dorrance).

SAURURACEAE

20. *Saururus cernuus* L.—Swamp-dragon, Combahee River, S. Car. (L. A. Beckman).

JUGLANDACEAE

21. *Juglans cinerea* L.—Noyer tendre, Missouri, (Dorrance).
22. *Juglans nigra* L.—Noyer de France, Missouri (Dorrance).

BETULACEAE

23. *Corylus rostrata* Aiton.—Horned hazel (David Thomas, Travels, etc., 1819, p. 222).

URTICACEAE

24. *Celtis occidentalis* L.—Bois connu, a syncopated form of bois inconnu, Louisiana (Dorrance); hagberry,[1] hoop-wood, Kentucky and Virginia; sugarnut, Kentucky Barton).

AMARANTHACEAE

25. *Acnida cannabina* L.—Marsh poke, Delaware (C. Cottam).
26. *Alternanthera philoxeroides* Martius.—Pigweed, throughout lower South Carolina.

[1] Hagberry is a Scottish name for the bird cherry, Prunus Padus. It became corrupted to hackberry. Editor.

PHYTOLACCACEAE

27. *Phytolacca decandra* L.—Coak, Genesee River, N. Y. (Barton).

CARYOPHYLLACEAE

28. *Spergula arvensis* L.—Wild-flax, Skagit County, Wash. (W. H. Ransom).

CERATOPHYLLACEAE

29. *Ceratophyllum demersum* L.—Water-cedar, Wakulla, Fla.

NYMPHAEACEAE

30. *Cabomba caroliniana* Gray.—Fanwort, fish-grass, Washington-grass, Washington plant (Trade names).

RANUNCULACEAE

31. *Cimicifuga racemosa* L.—Big snake-root, Maryland (Barton).
32. *Actaea alba* L.—Richweed, Virginia (Barton).

MAGNOLIACEAE

33. *Liriodendron tulipifera* L.—Bois jaune, Louisiana and Missouri (Dorrance); a tree with much white (or sap) wood is called white-wood, one with much yellow (or heart) wood is called yellow-wood; New York (Barton).

ANONACEAE

34. *Asimina triloba* Dunal.—Aciminier, assiminer, the fruit aciminie, assimine, Missouri (from an Algonquian term rassimina); acmine, jasmine, Louisiana (Dorrance).

BERBERIDACEAE

35. *Podophyllum peltatum* L.—Umbrella-root, Virginia (Barton); the fruit, citron, Missouri (Dorrance).

LAURACEAE

36. *Benzoin aestivale* L.—Poivrier, wild pimento, Missouri (Dorrance).

PLATANACEAE

37. *Platanus occidentalis*. L.—Cotonnier, Louisiana (Dorrance).

ROSACEAE

38. *Crataegus* spp.—Cenellier, the fruit, cenelle, Canada and Louisiana (Dorrance).

LEGUMINOSAE

39. *Gleditsia triacanthos* L.—Honey tree (Robert Beverley, History of Virginia, 1722, p. 118).
40. *Cercis canadensis* L.—Bois noir, Missouri (Dorrance); fish-blossom (David Thomas, Travels, etc., 1819, p. 67).
41. *Baptisia australis* L.—Wild pea, North Fork of the Shenandoah River, Va. (Barton).
42. *Glottidium vesicarium* Jacquin.—Mole-bean, Hilton Head Id., S. Car.
43. *Pueraria Thunbergiana* Siebold and Zuccarini.—Porch-vine, Alabama (Soil Conversation, 1(8), March 1936, p. 12).

EMPETRACEAE

44. *Empetrum nigrum* Tournefort.—Bear-berry, Labrador (Geo. H. Mackay, The Auk, 9(1), Jan. 1892, p. 16).

SIMARUBACEAE

45. *Simmondsia californica* Nuttall.—Sheep nut, wild hazelnut.

ANACARDIACEAE

46. *Rhus toxicodendron* L.—Herbe à la puce, Canada and Louisiana (Dorrance); running ivy, Muskeget Id., Mass. (Geo. H. Mackay, The Auk, 12, 1895, p. 33).

AQUIFOLIACEAE

47. *Ilex opaca* Aiton.—Christmas-berry, Jekyll Id., Ga.

MALVACEAE

48. *Abutilon Theophrasti Medic.* (*A. Abutilon* L.)—Wild-cotton, Culpepper, Va. (Barton).

BUETTNERIACEAE

49. *Melochia corchorifolia* L.—Chocolate-weed, South Carolina, and Georgia.

PASSIFLORACEAE

50. *Passiflora incarnata* L.—The term maypop now generally

used in the Southeastern States seems traceable to maracock (William Strachey, The historie of travaile into Virginia Britannia, c. 1618, Reprint 1849, p. 72) and maricock, said to be an Indian word (Robert Beverley, History of Virginia, 1722, p. 125), as we find the intermediate term may cock in John Lawson's History of Carolina ((1714) 1860, p. 159).

ELAEAGNACEAE

51. *Shepherdia canadensis* L.—Canadian sallow-thorn (Barton).

ONAGRACEAE

52. *Isnardia palustris* L.—Water-weed, Combahee River, S. Car. (L. A. Beckman).

HALORAGIDACEAE

53. *Myriophyllum pinnatum* Walter.—Rooted coontail, Combahee River, S. Car. (L. A. Beckman).

ARALIACEAE

54. *Aralia spinosa* L.—Tear-blanket, Isom Lake, Tenn.

UMBELLIFERAE

55. *Eryngium aquaticum* L.—Contrayerva, "the two Carolinas, W. Bartram" (Barton).
56. *Daucus carota* L.—Herbe à dinde (because fed to young turkeys), Missouri (Dorrance).

ERICACEAE

57. *Rhododendron maximum* L.—Laurel (with no modifier), Maryland and Virginia (Barton); Great Smoky Mountains, Tenn. (Science News Letter, 30(799), Aug. 1, 1936, p. 69).
58. *Kalmia latifolia* L.—Little laurel, Western Maryland (F. Warnick); ivy, Great Smoky Mountains, Tenn. (Science News Letter, 30(799), Aug. 1, 1936, p. 69).
59. *Vaccinium ovatum* Pursh.—Shotberry, Nehalem, Ore. (Gene Simpson).

EBENACEAE

60. *Diospyros virginiana* L.—Plaqueminier, Louisiana (Dorrance).

OLEACEAE

61. *Chionanthus virginica* L.—Father grey-beard, Virginia (Barton).

LABIATAE

62. *Trichostema dichotomum* L.—Pennyroyal, Maryland near Harper's Ferry (Barton).
63. *Clinopodium Nepeta* L.—Horse-mint, Monticello, Va.; wild horehound, Staunton, Va. (Barton). I am obliged to Dr. John K. Small for indicating the probable identity of this plant for which Barton gives four scientific names.
64. *Collinsonia canadensis* L.—Mountain balm, Virginia; rattlesnakeroot, Charleston, W. Va. (Barton).

SOLANACEAE

65. *Solanum carolinense* L.—Irish plumb (David Thomas, Travels, etc., 1819, p. 224).
66. *Physalis virginiana* Miller.—Hog plum, wild pompion, Niagara Falls, N. Y. (Barton).
67. *Hyoscyamus niger* L.—Henbeem or henbean, corruptions of henbane; devil's-cabbage; all in Maryland, near Harper's Ferry (Barton).

SCROPHULARIACEAE

68. *Verbascum Thapsus* L.—Bouillon blanc (used as a decoction to reduce swellings), Louisiana and Missouri (Dorrance).

MARTYNIACEAE

69. *Martynia louisiana* Miller.—Cuckold's-horn, and a corruption cockle-horn, near Charlottesville, Va. (Barton).

RUBIACEAE

70. *Mitchella repens* L.—Heath-hen plum, Long Id., N. Y., S. L. Mitchell (in Herbert, H. W., Frank Forester's Field Sports of the U. S., etc., 1, 1873, p. 56).
71. *Cephalanthus occidentalis* L.—Button-flower (David Thomas, Travels, etc., 1819, p. 222).
72. *Symphoricarpos* sp.—Herbe à balai (formerly used for brooms), buck-brush, deerberry, Missouri (Dorrance).
73. *Triosteum perfoliatum* L.—Gentian, Warm Springs Mt., Va. (Barton).

74. *Viburnum rufidulum* Rafinesque.—Alisier, the fruit, alise, Louisiana; in Missouri these names are applied to either black (*Viburnum*) or red (*Crataegus*) haws (Dorrance).

Compositae

75. *Vernonia noveboracensis* L.—Devil's-bit, Charleston, W. Va. (Barton).
76. *Eupatorium coelestinum* L.—Wooly-head, Columbia, Pa. (Barton).
77. *Baccharis* spp.—Cotton-bush, sea-island myrtle, Georgia, South Carolina; there is an excusable tendency to confuse *Baccharis* and *Iva* in the application of local names and the terms, marsh elder and hightide bush, according to Clarence Cottam, are so confused on the New York coast, and the appellation kink-bush similarly misused near Ocean City, Md.
78. *Xanthium* spp.—Herbe à coquin, Louisiana (Dorrance).
79. *Cotula coronopifolia* L.—Brassbuttons, Long Point Id., Calif.
80. *Tussilago farfara* L.—The name pooke for "Colts-foote" (William Wood, New Englands Prospect, 1634 (1898 reprint), p. 107) appears to be the forerunner of poke, now applied most commonly, perhaps, to *Phytolacca decandra*.
81. *Hypochaeris radicata* L.—Yellow weed, Nehalem, Ore. (Gene Simpson).

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Biological Survey
Washington, D. C.

Mimicry in two southern weeds

Roland M. Harper

On a spring day about twelve years ago some acquaintance in Tallahassee, Florida, brought me for identification a living rosette of pinnatifid leaves an inch or less in length. Without flowers or fruit the best guess I could make was that it was a little Cruciferous weed, known at different times as *Senebiera pinnatifida*, *Coronopus didymus*, and *Carara didyma*. If I had been sufficiently interested I could have found where it came from and watched it until it bloomed, but I was too engrossed with other matters, and the weed did not seem important.

There the matter rested until April 25, 1927, when I found what was evidently the same plant on a roadside near a barnyard in Dallas County, Alabama. It showed then in the middle of each rosette a sessile head of small woolly achenes. No corolla or stamens could be detected, even in the youngest plants, and I did not even know the family, until specimens were sent to the National Herbarium and New York Botanical Garden, and identified as a species of *Soliva* or *Gymnostyles* (Compositae). There was still some uncertainty about the species, on account of rather inadequate descriptions in the books, but a note on the occurrence of the same species in Louisiana, published soon afterward by Prof. Clair A. Brown,[1] and some extracts from the original description, kindly supplied by him, helped clear up the difficulty.

Since then I have seen it in or near Quincy and Tallahassee, Florida; Thomasville, Georgia; and in Talladega, Tuscaloosa, Autauga, Dallas and perhaps other counties in Alabama; Wilkinson County, Mississippi; and in a few places in Louisiana (Prof. Brown being with me at some of them in April, 1936). It is probably fairly widely distributed in these states now, but whether it has been there a long time, and been overlooked on account of its small size, or has extended its range lately, it is hard to say. Its favorite habitat is firm soil in dooryards, barnyards, roadsides, etc., where the grass is sparse or absent; and, like *Juncus tenuis*, it seems to thrive where people walk on it. It commonly grows in small colonies, with the individual

[1] Torreya, **29**: 155, 1929.

rosettes connected by filiform stolons just beneath the surface of the ground.

Under the name *Soliva nasturtiifolia* it is recorded in Chapman's Flora of the Southern United States (1860) as occurring around Charleston, S. C., introduced, but with no indication of its native country or its habitat in South Carolina. No such plant is listed in Mohr's Plant Life of Alabama (1901). It appears in Small's Flora of the Southeastern United States (1903 and 1913) under the same name, and in his Manual of the Southeastern Flora (1933) as *Gymnostyles nasturtiifolia*. In Small's Flora its range is given as from North Carolina to Florida, with no intimation that it grows in any other country; but in his Manual its range is extended west to Louisiana, and it is said to be native of South America.

In the first paragraph I mentioned the resemblance of *Gymnostyles* to *Coronopus*, or *Carara didyma* as it is now called. In the last six or seven years I have seen these two species growing close together in Quincy, Fla., Tuscaloosa, Ala., and on the campus of Louisiana State University, if not elsewhere, and the resemblance is very striking when the *Carara* is young, before it develops its horizontal stem and small racemes of flowers and fruit. Single leaves of the two plants put side by side can hardly be distinguished by external appearances, though very likely there are internal differences correlated with the presence of an aromatic oil in *Carara* as in most Cruciferae.

Although the two species can sometimes be found growing within an inch of each other, it is hard to find a place where they are both abundant enough, and unmixed with other vegetation, to be photographed satisfactorily in the field. And the dark soil on which they usually grow increases the difficulty. However, in May, 1937, I collected some of both between the sidewalk and street in a mediocre residential section of Tuscaloosa, and photographed them on a white background after they were dried, with the results shown in the figure. If they had been collected a few weeks earlier, when the stems of the crucifer were less developed, the resemblance would have been still closer.

Whether or not there is any significance in this resemblance is a puzzle. Several cases are known of pairs of unrelated plants which grow in the same habitat and bloom at the same time,

with flowers appearing very similar at a little distance, and probably pollinated by the same insects.[2] But just what advantage two weeds growing in the same habitat could derive from having similar foliage is not obvious. In the insect world cases are recorded of species protected from predatory enemies by their resemblance to another species with an offensive odor or taste, and there may possibly be some such factor involved here.

The *Carara*, which is widely distributed in the United States, is commonly supposed to be native of Europe; but Mohr mentions its occurrence in Brazil also, and it is possible that both

Gymnostyles nasturtiifolia (left) and *Carara didyma* (right), collected close together in Tuscaloosa, Ala., May 13, 1937, and photographed in the office on May 31. About one-third natural size. Note the close similarity of the leaves.

it and the *Gymnostyles* originated there, and developed a similarity of foliage in response to some environmental factor at present unknown.

Another somewhat similar case is that of *Rumex pulcher* and *Erysimum officinale* (formerly called *Sisymbrium officinale*). Both are roadside weeds, supposed to be natives of Europe,

[2] One of the most striking cases is that of *Viola pedata* and *Iris verna*, described in Torreya **6**: 192–193, 1906, and observed in other Alabama counties in later years.

blooming in the South in late spring, and drying up in summer. I have seen (and photographed) them growing close together in Tallahassee, Fla., and they resemble each other in height and especially in mode of branching. But that may not mean much, for one of them is presumably wind-pollinated and the other insect-pollinated. However, their mimicry may possibly give one of them a little extra protection from grazing animals.

A near relative of our *Gymnostyles*, formerly regarded as congeneric with it, deserves brief mention. It is *Soliva sessilis*, another native of South America, not mentioned by Chapman or Mohr, or in Small's Flora, but listed in Small's Manual, and said to range from northern Florida to Louisiana. It resembles the *Gymnostyles* in forming prostrate colonies, drying up and disappearing in summer, and having small heads of achenes, with corolla and stamens inconspicuous or wanting in most of the flowers; but the style instead of being weak as in *Gymnostyles* becomes a sharp spine when mature, readily attaching itself to a bare foot or paw that steps on the plant. And it has branched stems a few inches long, and finely dissected leaves.

I first met with this plant on a roadside near Evergreen, Ala., on April 21, 1927, and soon afterward found it common around Claiborne (in Monroe County), and in the city of Mobile. One would hardly suppose Dr. Mohr could have overlooked it if it had been as common in Mobile in his lifetime as it is now; but Claiborne was a flourishing place over 100 years ago, and is almost deserted now, and one would suppose that the plant would have had better opportunities to get established there in the busy days than in recent years. We may never know its history, though. I have also seen it in Tallahassee, Fla., and with Prof. Brown recently in Louisiana.

The putting of *Gymnostyles nasturtiifolia* and *Soliva sessilis* in different genera would seem amply justified if they had no nearer relatives (because different modes of dissemination hardly ever occur in the same genus, if for no other reason). But *Gymnostyles anthemifolia*, which Prof. Brown showed me around Baton Rouge, and I saw elsewhere in southern Louisiana last year, is a sort of connecting link, almost exactly intermediate (though hardly a hybrid). According to Small it occurs from northern Florida to Texas, and is native of South America, like the others.

In our books that describe these plants they are put in the tribe Anthemideae; but I am inclined to question that. For the typical Anthemideae are strongly—sometimes agreeably—scented (e.g., *Achillea*, *Chamomilla*, *Tanacetum*, *Artemisia*, *Santolina*), while the species in question are odorless or practically so. Then too most of the Anthemideae have conspicuous ray-flowers (e.g., *Anthemis*, *Chrysanthemum*), while our plants have no ray flowers, and what few corollas they have are so minute that I have never been able to detect them. Most of the flowers lack stamens also; and if they are Anthemideae they are degenerate members of the tribe. Their awned achenes, and lack of appeal to pollen-carrying insects, suggest an affinity to *Ambrosia*, which with a few other genera is now excluded from the Compositae proper.

University, Ala.

A correction

Edward W. Berry

In 1924 I described, under the name of *Calcophysoides balli*, a supposed cucurbitaceous fruit which had been sent to me by Professor O. M. Ball, and which came from Foard County, Texas.[1] This year a similar but smaller specimen was sent to Dr. Roland W. Brown of the U. S. Geological Survey from Idalia, Missouri, and a third from Brookings, South Dakota.

Due to the acumen of Dr. Brown it is now clear that all three specimens are baked clay artifacts and not fossil fruits, and the above name consequently should disappear in the limbo of mistaken identities, at least that is my hope.

My original specimen was cut transverse, as was also the specimen from Idalia, which I have not seen. These both show flow structure, irregular cavities, which before firing contained binder to make them come out porous. One had a baked fingerprint on the outside and the other a large cinder near the periphery. I quote these in part from Brown's letter to me. It has been suggested that these artifacts are of the nature of the so-called Cape Cod fire lighters, which seems a likely interpretation. The entire credit for clearing up the nature of these objects belongs to Dr. Brown and I am very glad of the opportunity of correcting my mistake.

The Johns Hopkins University,
Baltimore, Md.

[1] Torreya, **24**: 5–7, 1924.

FIELD TRIPS OF THE CLUB

Trip of June 13 to Echo Lake, N. J.

Seven members and three guests were present on this trip. The interesting associations along the railroad tracks and adjoining woods at Charlottesburg were studied and then the territory adjacent to Echo Lake. Kanouse Mountain was climbed and on its summit Dr. B. T. Butler gave a most interesting and instructive talk on the geology of the region, pointing out the remarkable character of the Green Pond conglomerate (Silurian age) which makes up this and one adjacent ridge, surrounded on all sides by ridges of Archean rock. Two hundred and forty species of wild plants were identified, including such interesting ones as *Comandra umbellata*, *Melampyrum lineare* var. *latifolium*, *Cynthia virginica*, *Gratiola neglecta*, *Gillenia trifoliata*, *Angelica villosa*, *Asclepias quadrifolia*, *Asplenium platyneuron*, *Cornus rugosa*, *C. foemina*, *Corylus cornuta*, *Callitriche Austini*, *Silene antirrhina*, *Equisetum sylvaticum*, *Cryptotaenia canadensis*, *Diervilla lonicera*, *Dioscorea villosa*, *Radicula palustris*, *Galium verum*, *Galium boreale*, *Panicum Bicknellii*, *Tragopogon pratensis*, and *Thalesia uniflora*.

H. N. Moldenke

Trip of June 25 to 28 to Gatlinburg, Tenn.

Friday morning, the group participating in the botanical foray were taken by Park officials from Gatlinburg to Greenbrier where the cars were left at the Great Smoky Mountains Hiking Club cabin. The trip for the day consisted of a nine mile hike over the new Greenbrier-Brushy Mountain Nature Trail which is being developed through the cooperation of the Botany Department of the University of Tennessee, the Hiking Club, and the Naturalist Service of the Park. This Nature Trail is unique in that it does not attempt to teach the names of plants and facts about them by labels; but has as its purpose the interpretation of the landscape as dynamic. This is attempted by a guidebook of about 25,000 words which, after laying a brief background in local geology, physiography, vegetation, plant geography, and ecology, describes eleven different vegetation types at stations along the trail. The trail itself is marked only by numbered posts, one at each station,

located in the best examples of the vegetation type. The structure and composition of the plant communities and their principal relationships are considered in successive sections of the guidebook. An appendix contains some scientific data relating to the region. As yet this trail is in the experimental stage. Those interested in it are appreciative of the comments given by the members of the botanical foray.

Some of the principal forest types along the trail represented by virgin stands are: hemlock ridge type, mixed cove hardwoods (undifferentiated climax), buckeye-basswood cove type, prealpine beech gap type, pine-heath, spruce, and fir. Different examples of the very interesting heath balds, or laurel slicks, were seen Brushy Mt. especially was of interest in this respect. These treeless communities dominated by shrubs of the heath family range from narrow ridge-top communities to broad mountain-top and upper slope stands. The shrubby growth ranges from low stands of *Leiophyllum* a foot or two high to almost impenetrable thickets of *Rhododendron* and *Kalmia* fifteen or twenty feet tall. The soil of these communities is always strongly podzolized and in some instances is covered by a thick layer of peat reaching a depth of three feet or more. This peat accumulation is all the more striking inasmuch as it develops not in basins but on steep slopes and sharp rocky ridges.

The region is rich in Ericales. *Kalmia latifolia* was found on hundreds of acres along the trail in excellent flowering condition. *Rhododendron catawbiense* was past its prime but some plants in fine flower were seen at higher elevations. (Some of the party who went later to Mt. LeConte found this magnificent shrub in its prime.) *Rhododendron carolinianum* was in flower on Brushy Mt. (4,911 ft. elev.) and *R. maximum* was coming into bloom along the streams at lower elevations. Other members of the order seen in flower were: *Arsenococcus* (Lyonia, Xolisma) *ligustrinus*, *Decachaena* (Gaylussacia) *ursina*, *Leiophyllum* (Dendrium) *Lyoni*, *Menziesia pilosa*, *Galax aphylla*, *Monotropa uniflora*, and *Azalea calendulacea*. The latter occurs in a multitude of colors from pale yellow to deep flame. Several members of the order which were observed, although not in flower, were *Decachaena baccata*, *Epigaea repens* and

Gaultheria procumbens in great abundance, and several species of *Cyanococcus* (Vaccinium).

Several interesting endemics were seen on the trip. Some of them were *Abies Fraseri*, *Magnolia Fraseri*, *Halesia monticola*, *Ilex Beadlei*, *Leiophyllium Lyoni*, *Senecio Rugelia*, *Solidago glomerata*, *Diphylleia cymosa*, *Trillium Vaseri*, and *Aster Curtisii*. Dr. Fulling and others familiar with the plants of more northern regions were interested to see several at or near their southermost extension. Among them may be mentioned *Picea rubens*, *Acer spicatum*, *Acer pennsylvanicum*, *Sambucus pubens*, *Rubus canadensis*, *Dryopteris dilatata*, *Lycopodium lucidulum*, *Oxalis montana*, *Circaea alpina*, and *Clintonia borealis*.

Some members of Friday's foray remained for the Trail Conference and other botanical excursions to Mt. Leconte (6,593 ft. elev.), Clingman's Dome (6,642 ft. elev.), and other points of interest. A somewhat fuller report may be sought in *CASTANEA* published by the Southern Appalachian Botanical Club.

Stanley A. Cain

Trip of July 11 to Indian Kill Brook, N. Y.

Of the outstanding features of the trip,—the rocky stream bed along Indian Kill was a gallery of lichens,—the profusion of mushrooms from *Amanita rubescens* to *Boletus fellus*, Russulas green and viscid red, *Strobilomyces strobilaceus*, and *Craterellus cornucopoides*, was remarkable considering the antecedent dry weather. Of the non-vascular plants, nothing more shall here be said. *Monarda fistulosa*, whose local distribution in New York, according to Taylor's Flora of the Vicinity of N. Y., is "Occasional on L. I. & S. I., decreasing up the Hudson valley to northern Westchester Co. unknown elsewhere"; was found repeatedly in large colonies in Orange Co. From the beauty of that Monarda and *Apocynum androsaemifolium* with large pure-white flowers we turned our attention to the homely *Rumex mexicanus*. In the woods we collected an Hypopitys whose dense pubescence on its ovary extended up the style and culminated in a patriarchal beard on the stigma and thus should be *H. lanuginosa* but had the lemon-yellow color of *H. ameri-*

cana. At lunch time we gathered a bouquet of *Carex lupulina*, *C. intumescens*, *C. lurida*, softened with the blue of *Campanula aparinoides*, *Myosotis laxa*, and *Veronica scutellata*. *Proserpinaca palustris* bloomed with *Penthorum sedoides*. It was amusing to contrast the different species of Galium:—*circaezans*, brown flowered *pilosun*, *Aparine*, *triflorum*, three-petaled *Claytonia*, *asprellum lanceolatum*. We did not bid au revoir to Southfields without examining a most gigantic hispid *Geum virginianum*. . . . Since we collected Aureolaria (Dasystoma, Gerardia) for determination may I warn that the key of Britton or Gray lead to an error? and may I append a supplement adapted from Pennel to Britton's key?

1. Plant very glandular	A. pedicularia.
1. Plant not glandular	2.
2. Stem pubescent	3.
2. Stem glabrous	4.
3. Capsule pubescent	A. virginica.
3. Capsule glabrous; westerly	A. grandiflora
4. Stem green; lower leaves lanceolate widest below middle long acuminate	A. laevigata.
4. Stem glaucous; lower leaves elliptic-ovate widest about middle not long acuminate.	A. flava.

Joseph Monachino

Trip of July 25 to Cold Spring Harbor, Long Island

For a distance of about three miles, the group rambled on the foot-path along the shores of three large lakes, stopping for *Spirodela polyrhyza*, *Myriophyllum sp.*, *Impatiens pallida*, and what was probably *Utricularia clandestina*. Along First Lake, is a boggy stretch where an old railroad bed still remains. This yielded *Gratiola aurea*, *Lilium superbum*, *Woodwardia virginica*, *Lycopodium lucidulum*, *Asclepias incarnata*, *Phytolacca decandra* and an abundance of *Radicula* (probably *aquatica*). At the Fish Hatchery just beyond, is a huge specimen of *Platanus occidentalis*, and in the fish tanks themselves, enough for all, of *Marchantia* (sp.) in all its forms. In front of the "Haunted House" is a good specimen of *Aralia Spinosa*, the so-called "Hercules Club."

After lunching on the sand-spit a stroll along the beach revealed only a stray piece of *Ulva lactuca* and *Fucus vesicularis*. While the outer side of the Spit appears to have no growth of plants, the inner border, facing the harbor, has a dense growth of *Spartina glabra*, while the more delicate *S. patens* fills the area where the sandbar joins the mainland displacing *Ammophila arenaria*,—which otherwise covers the sand. Other plants found here are *Limonium carolinianum*, *Salicornia europea*, and *Salsola Kali*.

Mrs. H. W. deForest had invited the Torrey Club to visit her garden. This was truly a "lovesome spot." The rustic gateway was hung with pink clematis, great masses of pink and white phlox filled the garden with their fragrance. Wall-flowers, pyrethrums, campanulas, and real heather bloomed against a backing of yew. Below, in a sunken area, were plantings of tea roses; to one side, in a portico, were oleanders growing in tubs. The wide lawn presented *Taxodium*, *Magnolia*, and *Carya ovata*,—and *Pachysandra* was everywhere.

Dr. Avery, of the Carnegie Institute of Washington, acting for Dr. Blakeslee exhibited and explained the breeding experiments with *Datura* which have been in progress for a number of years. Apparently in the reduction division, variations are brought about in the inheritance of the plant when the chromosomes fail to pair off in orthodox fashion; in other instances, the chromosomes which have paired, fail to separate again. By careful breeding, plants with the haploid, diploid and triploid numbers of chromosomes, and with a variety of chromosome combinations have been obtained. Our party had the opportunity of viewing an entire plantation of *Datura* all abloom and distributing a fine perfume. Dr. and Mrs. Avery entertained the group in their wild flower garden which contains over five hundred species mostly collected from Long Island. These include several rare orchids and ferns, many mints, and other prizes too numerous to recount here.

Dolores J. Fay

NEWS NOTES

The 1937 Yearbook of the Department of Agriculture is a continuation of that of 1936 with 45 articles on genetics and breeding of plants and animals. In announcing the publication of the yearbook Secretary Wallace says "In sending out this second and last of the two Yearbooks on genetics and breeding I would not want anyone to think that they complete the account of the efforts of plant and animal breeders in the United States. On the contrary I would wish these Yearbooks to be looked on as pointing the way toward a field of activity that will accomplish much more in the future than has been accomplished in the past." "If genetics enables us to outdo nature's own efforts it is because it is in the truest sense a science of cooperation with nature." "Man's control of his own future may depend in the long run on whether his biological knowledge, which is constructive, can catch up with his knowledge of the physical sciences, which has taught him so much about how to destroy."

A botanical garden and arboretum at Huntington College, Indiana was dedicated on the twelfth of June. Together they comprise some 43 acres, most of it already wooded. It is planned to have all plants native of the region growing in the garden, arranged as far as possible by families. The arboretum is to contain all species of woody plants of the state. The two are to be named for Dr. Frederick A. Loew who has made the plans and begun the development.

Dr. Ellsworth P. Killip of the United States National Herbarium, has been authorized by an act of Congress to accept the award of Chavalier of the French Legion of Honor, recently conferred on him by the French Government.

Dr. Margaret C. Ferguson, research professor of botany at Wellesley College, was awarded an honorary degree of Doctor of Science at the centennial celebration of Mount Holyoke College this spring.

Dr. Walter Robyns, professor of botany at the University of Brussels and director of the Royal Botanical Garden and of the National Herbarium, arrived in New York for a visit on August 9. He was welcomed by a dinner attended by the botanists of the New York area at the Columbia Faculty Club on

August 11. During his visit to this country he is visiting botanical gardens and museums as well as many of our national parks. His trip takes him as far as Hawaii.

Dr. Nathaniel L. Gardner died on August 15 at Berkeley, California, at the age of 73. Dr. Gardiner was an authority on the water plants of the Pacific Coast. He was emeritus curator and professor of botany at the University of California, with which institution he had been connected for 30 years.

Dr. Vernon Kellogg died at Hartford, Conn. on August 8 at the age of 69. Dr. Kellogg was professor of biology at Leland Stanford University for nearly twenty-five years, helped with Belgian Relief under Herbert Hoover, and was permanent secretary of the National Research Council from 1919 until his resignation in 1932.

Dr. George Perkins Clinton, botanist at the Connecticut Agricultural Experiment Station until his retirement the first of last July, died on August 13 at the age of 71.

Dr. Charles Beach Atwell, emeritus professor of botany at Northwestern University, died on September 14 at the age of eighty-two years. Dr. Atwell, a graduate of Syracuse University, joined the faculty of Northwestern University in 1880 and retired in 1928.

Dr. Edward H. Graham, formerly assistant curator of botany at the Carnegie Museum of Pittsburgh, has become biologist in the Section of Wildlife Management of the Soil Conservation Service, Washington, D. C.

A large collection of mammals, birds, reptiles and plants of Panama have been brought to the U. S. National Museum by Dr. Gerrit S. Miller, Jr. By accompanying Army engineers who were cutting new roads through the jungle he was enabled to secure a large number of epiphytes that were growing on the tops of tall trees.

Dr. A. C. Smith, Associate Curator of the New York Botanical Garden, sailed on Aug. 27 with the Holden expedition of the American Museum of Natural History. The expedition has for its primary object the studying of diseases and drugs of the Indian tribes along the northern tributaries of the Amazon River. The expedition will also collect reptiles, amphibians,

insects and small mammals and plants. The region, the southern boundary of British Guiana, is one of low mountains, presumably heavily forested, and virtually unknown from a botanical standpoint. Dr. Smith expects to return about the first of next April.

In August the Post Office Department issued a special three cent stamp commemorating the Ordinance of 1787. On the stamp beside the map of the region of Ohio and west covered by the Ordinance, are the heads of Cutler and Putnam. The Cutler shown was Manasseh Cutler (1742–1823) who probably drew the first draft of the Ordinance and was one of the founders of the Ohio Company. This versatile man was not only a statesman, but a clergyman, doctor and teacher. In addition he was a scientist, at the time ranking second only to Benjamin Franklin in this country. His scientific interests included astronomy, microscopy, electricity, archeology and more than any of these, botany. His article describing and classifying 350 species of New England plants according to the Linnaean system was the first paper of the kind published in America. He also wrote a chapter on the trees and plants of New Hampshire for a history of the state.

THE TORREY BOTANICAL CLUB

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BY

GEORGE T. HASTINGS

John Torrey, 1796-1873

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TORREYA

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The botany of the California Islands

T. D. A. Cockerell

There are eight islands off the coast of Southern California. The northern group, visible from Santa Barbara, are Anacapa, Santa Cruz, Santa Rosa, and San Miguel, enumerating them from east to west. The southern group, much more widely scattered, consists of Santa Catalina, San Clemente, Santa Barbara and San Nicolas. It is confusing to find the northern islands often referred to as the Santa Barbara islands, whereas Santa Barbara Island is the smallest of the southern group. These islands, believed to have been separated from the mainland in Pleistocene times, are of extraordinary interest because they have upon them so many endemic animals and plants. The endemic animals include fifteen mammals, fifteen birds, two lizards, two salamanders, sixteen land molluscs, and an undetermined number of insects. The plants include over eighty species and races.

Although the islands were discovered by the expedition led by Captain Juan Rodriguez Cabrillo in 1542, knowledge of their plants came very slowly. Nearly 90 years ago Nuttall described a few from the collections of Dr. Wm. Gambel, the ornithologist, who visisted California at the beginning of the forties. These included the remarkable endemic shrub, *Crossosoma californicum* Nuttall, the only genus of the family Crossosomataceae. A second species, *C. Bigelovii* Watson, has since been found on the mainland, in the desert area of the southwest. After a very long interval, the botany of San Clemente was partly made known through a visit in 1885 of J. C. Nevin and W. S. Lyon (Madrono, Vol. 2, 1931, p. 25), who discovered some very interesting endemics. It was Lyon who sent to Asa Gray the endemic and very distinct genus of trees, *Lyonothamnus*, found by him on Catalina Island. Not long after, E. L. Greene visited Santa Cruz and San Miguel; on San Miguel he was in time (1886) to see growing the tree-mallow, *Lavatera*, which has now entirely disappeared from the island. In more

recent years, Ralph Hoffmann, Director of the Santa Barbara Museum, made very extensive collections on all the northern islands. His herbarium, beautifully mounted and carefully named (with the assistance of various specialists) is in the Santa Barbara Museum of Natural History.

Hoffmann published a list of numerous additions to the island floras, and would have dealt with the whole subject in a comprehensive manner, but for his lamentable death on San Miguel Island on July 21, 1932. He was climbing a cliff in the effort to obtain specimens of a *Dudleya* (or *Echeveria*) which he thought might prove new. A small pick which he used in climbing broke, and this apparently caused him to fall, his death being instantaneous. Hoffmann was an excellent ornithologist as well as botanist, a man whose loss we can never cease to lament.

The southern islands have been visited by many botanists, especially of course Santa Catalina which is a famous tourist resort, and is easily reached. C. F. Millspaugh and L. W. Nuttall have published a Flora of Santa Catalina Island (1923), which is very comprehensive, including not only the flowering plants and ferns, but the mosses (28 species), the Hepaticae (8 species), the lichens (167 species and varieties), the fungi (203 species) and the Mycetozoa (8 species). Twenty nine species of fungi are described as new, but it is very likely that none is a true endemic. Several occur on cultivated or introduced plants. Including varieties (races), the recorded flowering plants and ferns of the eight islands collectively appears to number about 750. It may perhaps be surmised that there are actually about 900 distinct forms.* Hoffmann's island herbarium (from the northern islands only) numbers 620. Of the approximately or nearly 90 endemics, about one third are found on both the northern and southern islands, one third on the northern group only, and one third on the southern. But it must be added that there are eleven island endemics which also live far to the south, on Guadalupe Island, which is out on the Pacific 135 miles S.W. from Point San Antonio, Lower California. One of the island plants, *Pinus remorata*, is also found on Cedros Island, near the coast of Lower California. It is also reported as occurring in the Pleistocene of

* I can add one to the recorded list; the grass *Distichlis dentata* Rydberg (det. by Mrs. Chase), which I obtained on San Miguel.

Carpinteria, near Santa Barbara, but it is not certain that it grew there. Chaney and Mason have described a Pleistocene flora of nine species, found on Santa Cruz. All the species are living, but only one (*Pinus remorata*) still exists on any of the islands. The flora is said to most resemble that about Fort Bragg, 440 miles N.N.W. It includes large trunks of *Pseudotsuga taxifolia*, wood and cones of *Cupressus Goveniana*, seeds of *Garrya elliptica* etc. Remains of mammoths (*Elephas*), found on Santa Cruz, Santa Rosa and San Miguel are perhaps contemporaneous with this flora. At all events, with the sole exception of the pine, it disappeared, to be replaced by a quite different and more xerophilous flora. When or how the latter arrived remains a matter for conjecture. The geologists postulate a large area of land, called Catalinia, existing during part of the Tertiary time, and it may be that such distinct endemics as the *Crossosoma* and *Lyonothamnus* have continuously occupied this land, or what there was of it above water, since Mid-Tertiary time or earlier. Most of the endemics, however, are quite closely related to species of the mainland, and may be presumed to have evolved during or since the Pleistocene. Some of them seem very well adapted to their surroundings, and flourish exceedingly. I visited San Miguel with a group of Senior Boy Scouts, and noticed, as Greene had fifty-one years before, how the grey-green bladder pod, *Astragalus miguelensis* Greene, overran the island. It has an advantage (which of course did not exist when it first evolved) in not being eaten to any extent by the sheep. Mr. Robert Brooks tells me that it is poisonous to them, a sort of loco-weed. He also states that the excessively abundant ice-plant, *Mesembryanthemum crystallinum*, acts as a purgative on the sheep, and is avoided, though at a pinch it can serve as a source of enough water to maintain life. This *Mesembryanthemum* is also African, and is generally supposed to have been introduced from Africa, but Greene argues strongly that it is indigenous. There are strand plants, such as *Convolvulus soldanella* (which Hoffmann collected on Santa Cruz) which are widely distributed over the world, probably through the agency of birds.

There are certain species, as *Erysimum insulare* Greene (with yellow flowers and spreading pods), and *Opuntia littoralis* Engelm. (with yellow spines) which are extremely characteristic of the islands but have been removed from the list of

endemics, because they occur in certain regions on the mainland. It seems not impossible that they were originally true endemics, and somehow got carried across the water. The Indians might have used the prickly-pear fruits for food and so transported them. They might even have found nutriment in the abundant yellow seeds of the *Erysimum;* the seeds of *Salvia columbariae*, according to Millspaugh and Nuttall, were ground into meal, for porridge and cakes.

The clearest cases of true island endemics, that is, forms which have developed their special character upon the islands, are found among the mammals. Baird in 1857, described the small fox *Urocyon littoralis* from San Miguel Island. We now know special races of this animal, each with distinctive characters, from Santa Catalina, San Clemente, San Nicolas, Santa Cruz and Santa Rosa. The smaller Santa Barbara and Anacapa appear to be without foxes. The remarkable tendency of mammals to form insular races is shown by the recent discovery of a special kind of mole (*Scapanus latimanus insularis* Palmer) on Angel Island in San Francisco Bay. The foxes suggest that mere isolation, regardless of the special environment, has brought about the differentiation; but as a matter of fact the islands do present some very diverse conditions. Thus it can be well understood that the white-footed mice from the mountainous, rocky, forested Santa Cruz should be darker than those from the sand-dunes of San Miguel.

I have tried to find evidence of cases among the plants to parallel those of the mammals and birds. One of the best seems to be in the Malvaceae, with *Malvastrum catalinense* Eastwood on Santa Catalina, *M. clementinum* Munz and Johnston on San Clemente, and *M. nesioticum* Robinson on Santa Cruz. But what about that other more interesting member of the family, the Malva Rosa or Tree Mallow, *Lavatera assurgentiflora* Kellogg? Millspaugh and Nuttall, in Their Flora of Catalina, state that the type locality is Anacapa Island (where Hoffmann collected it on Sept. 22, 1930) and that the only other locality is Bird Rock, not a quarter of a mile from Fisherman's Cove, Catalina. They add that Greene described a number of supposed species, all based on plants known to have been transplanted from Anacapa or Bird Rock. This last statement is not correct, for Greene, in his very interesting account of his visit to San Miguel (Pittonia, Vol. 1, 1887) states that he found

there 30 small trees of the *Lavatera*, and in another place a few bushes, and proceeds to describe how the plant differs from that in cultivation. Many years later, finding also differences in the fruit, he described the San Miguel race as *Saviniona dendroidea*. It is now wholly extinct, but as the matter stands, it presumably represents an insular subspecies, *Lavatera assurgentiflora dendroidea*. With regard to the other four names offered by Greene, the case is not so clear. *Saviniona clementina*, from San Clemente, was based on a single tree, *S. reticulata* from Catalina also on one plant. Although Greene makes a point of the forms of *Saviniona* (which was founded for a species of the Canary Islands) being all insular, he actually describes *S. suspensa* from San Diego, and supposes the original plant of Kellogg to have come from the mainland of California, somewhere near San Francisco. In favor of the view that the forms on the several islands may be, or may have been, distinct, is the fact that Watson described three endemic species from the Mexican islands southward.

Another puzzling case is that of the Tree-poppies, *Dendromecon*, beautiful shrubs with yellow flowers. Munz accepts the insular representative, *D. Harfordii* Kellogg, as a valid species, and adds the remark: "variable and needing study." Greene (Pittonia Vol. 5) recognized five supposed species, the original *D. Harfordii* from Santa Rosa, *D. flexilis* from Santa Cruz, *D. densifolia* from Santa Rosa, *D. rhamnoides* from San Clemente, and *D. arborea* from Santa Catalina. These are all separated by stated characters, and presented in a table. But evidently Greene's material was insufficient, and it will be necessary to study the variation of the plants where they grow. Miss Alice Eastwood, in a letter just received, refers to "the great variability that insular floras always present." Millspaugh and Nuttall have repeatedly referred to the same phenomena in their account of Santa Catalina. Variability is often ascribed to crossing, which should be reduced to a minimum in the restricted floras of islands. Thus *Opuntia littoralis*, in its pure stands on the islands, appear very uniform; but on the mainland it crosses with other species, and confusion results. *Astragalus miguelensis* and *Erysimum insulare*, as I saw them on San Miguel, seemed to me very constant in their characters; so also *Malacothrix implicata* Eastwood, common along the cliffs by the sea, except that the rays were sometimes entirely

without the purplish tint. Yet in certain genera, for reasons which are obscure, there appears to arise a condition of mutability on islands, and perhaps we may say in general, at the periphery of the range. Such mutability is evidently advantageous, in that it provides the material for extensions into new territory, some of the variations being advantageous in the new environment. If the insular variability is an expression of such a tendency, we may suppose that it occurs principally during a period following the introduction of the species, and that after a time one of the forms proves best fitted to survive, and prevails to the exclusion of the rest. Thus such a species as *Astragalus miguelensis* would be a climax type, now stable; while certain of the poppies, *Dendromecon* and *Eschscholtzia*, are still in the variable stage, so that the number of "valid" forms is uncertain. It is evident that the thoughtful biologist, anxious to understand the processes of nature, will wish to study all these variable plants, and will not contemptuously dismiss them as "bad species."

Phacelia scabrella is one of the plants described by Greene from San Miguel, but it is ignored by Munz, who regards it as identical with *P. distans* Bentham. I found it dried up at the time of my visit but on one plant were two of the beautiful light blue flowers, and bees of the genus *Anthidium* were flying over it. Brand recognized *P. scabrella* as a variety of *P. distans*, occurring in the Coast Range northward, but southward only on the islands. It would thus fall in with a long list of plants cited by Munz as having a similar distribution.

The islands have suffered from the influence of man especially in two ways; they have been greatly overgrazed, and very numerous weeds and other plants have been introduced. The introduction of various forms of animal life is likely to also prove injurious. Thus, as Mr. E. Z. Rett explains to me, the foxes on Santa Cruz, about 1927, got scab from the sheep, and were almost exterminated, though they are now increasing again. This trouble has not occurred on San Miguel. Mr. D. B. Rogers informs me that Santa Barbara Island is now full of rabbits (introduced), and these must seriously affect the native flora. In a good many cases, the accidentally introduced plants are represented by only a few specimens, and do not appear to spread. Thus on San Miguel, 51 years ago, Greene said of *Marrubium vulgare*, "a single plant but that in flower and

fruit." I found it growing near the ranch house this year, but it is still a casual alien. The island lists have been greatly swollen by the inclusion of numerous aliens, so that in statistical treatment the proportion of endemics appears to be much less than it actually is, in relation to the original flora. Many of these aliens can be recognized at once, being of European or other exotic derivation, but there is no ready way to recognize California mainland species which may have been carried over during the past century. To this class would probably belong, for instance *Datura meteloides*, represented in the Hoffmann herbarium by two specimens, one from Santa Cruz and one from Santa Rosa, and also known from Santa Catalina. Something should be said about the absence of plants which might have been expected to occur. There are no gymnosperms whatever on the southern group of islands. Among the grasses, the Paniceae are all absent, and I find no records of *Bouteloua*, *Muhlenbergia*, *Sporobolus*, etc. Of the genera of grasses included by Munz in his S. California Manual, 26 are present on one or more of the islands, while 39 are absent. Of the Liliaceae, seven are present, eight absent, the latter including *Yucca*. *Myrica*, *Juglans*, *Alnus*, *Celtis*, *Castanopsis*, amd *Lithocarpus* are all absent. Only two genera of orchids are present. In the Ranunculaceae, three genera are present, seven absent, the latter including *Paeonia*, which from its mode of occurrence on the mainland might have been expected. Of the genera of Compositae (including *Cichoriaceae*) recognized by Munz, 61 are present, 66 absent. These and similar facts may be taken to indicate that the islands were not united with the mainland very recently.

The relationships of the Californian Island flora with that of the Mexican Islands southward is a matter of much interest. Was there once continuous land all the way to Guadalupe Island? The snails would suggest yes, the absence of land mammals on Guadalupe, no. But there are eleven of our island endemics which also occur on Guadalupe. These belong to the genera *Quercus*, *Eschscholtzia*, *Crossosoma*, *Lotus*, *Convolvulus*, *Oenothera*, *Gilia*, *Phacelia*, *Galvesia*, *Mimulus*, and *Hazardia*. Greene long ago gave lists of the plants he found on Cedros Island and the San Benito Islands, near the coast of Lower California. Of the 91 Cedros species about a fourth are also on the Californian Islands, of the 26 San Benito species, a third. These islands are approximately in Lat. 28°.

Boulder, Colo.

Cetraria islandica in Sussex County, N.J.

A large and robust colony of the Iceland Moss lichen, *Cetraria islandica*, perhaps the only one now existing in the State of New Jersey, was found by members of the Torrey Botanical Club on Oct. 12, 1937, on the slanting ledges of High Falls sandstone on the west side of a ridge, east of the road from Montague to Port Jervis, in the town of Montague, Sussex County, N. J. This ledge is a conspicuous feature of the ridge as the forest cover appears to have slid off for an extent of several acres. It is made more conspicuous from the road along the east bank of the Delaware by the large white painted sign of Rock View Inn, east of the slide. Glacial striae, pointing southwest, and probably protected by forest soil until it slid off, are frequent on the rock surface.

The *Cetraria islandica* is found growing mixed with *Cladonia uncialis*, *sylvatica* and *rangiferina*, and with grasses, other herbaceous plants, and low shrubs, along lines of weakness in the rock due to joint cracks. It is as tall, up to three inches high, as I have seen it in our range, or on Adirondack and New England summits. It occurs scatteringly in the range of the Torrey Botanical Club; in occasional small colonies in undisturbed soil in western Suffolk County, Long Island, and plentifully on the Shinnecock Hills and in some places on Montauk Point, and at East Marion on Orient Point. It has not been reported south of the New Jersey Highlands. Tuckerman cites it at Delaware Water Gap, reported by Austin, who collected all over north Jersey 75 years ago, but does not say whether it was on the New Jersey or Pennsylvania sides. I have rambled over Mount Tammany and other mountains in the New Jersey side, of the Water Gap, but have not seen it, nor have I seen it anywhere in suitable places along Kittatinny Mountain, from Water Gap to High Point. It occurs, in stunted forms, on the Shawangunk Mountain, at Sam's Point, High Point, and Gertrude's Nose; and in small quantity, near the highest points on Schunemunk Mountain, in Orange County. There is one good sized colony in the Harriman Section of the Palisades Interstate Park, on the Lichen Trail, on the northwest corner of Hogencamp Mountain, overlooking Island Pond. I have not seen it elsewhere on sum-

mits of the Hudson Highlands. It has been collected southward on the higher Appalachian Mountains, to North Carolina. John W. Thomson, Jr., of the Department of Botany, University of Wisconsin, sent me some last summer from the vicinity of Pennsylvania State College, in the Allegheny Plateau.

The Montague, N. J., colony is the most ample and robust one I know in the Club range, with the sole exception of that on Shinnecock Hills, L. I. Its survival is possibly due to the fact that it is protected from forest fires, the clumps growing on the open ledge which a fire in the surrounding hardwoods could not reach. It was probably once more plentiful in the Club range, but was killed by ground fires, except in spots where open ledges, or beach or dune sands prevented fires from spreading. The colonies on Shinnecock Hills have been reduced in recent years by fires in grass mixed with the lichens.

Raymond H. Torrey

Local flora notes

Recently discovered stations for plants rare in New Jersey, by James L. Edwards:

Asplenium Bradleyi D. C. Eaton—Newfoundland, Morris Co.

Asplenium montanum Willd.—Newfoundland Morris Co., and Breakneck Mt., Sussex Co.

Athyrium pycnocarpon (Spring) Tidestrom.—Andover Junction, Sussex Co., and Kerr's Corners, Warren Co.

Isoetes macrospora Dur.—Wawayanda Lake, Sussex Co.

Naias gracillima (A. Br.) Magnus—Hopper Pond, Bergen Co.

Scheuchzeria palustris L. var. *americana* Fernald.—Bog south of Lake Grinnell, Sussex Co.

Scirpus Torreyi Olney.—Howell's Pond, Sussex Co.

Eriophorum callitrix Cham.—Mt. Hope, Morris Co.

Carex Pseudo-Cyperus L.—Andover Junction, Sussex Co., and Mud Lake south of Lake Grinnell, Sussex Co.

Listera cordata (L.) R. Br.—Spruce swamp west of Harding Lake, Sussex Co.

Malaxis brachypoda A. Gray.—Sparta, Sussex Co.

Arceuthobium pusillum Peck.—Along the Appalachian Trail in Kittatinny Mt's., one half mile north of Sunfish Pond, Warren Co.

Potentilla palustris (L.) Scop.—Marsh about two miles northwest of Monroe, Sussex Co.

Kalmia polifolia Wang.—Bog south of Lake Grinnell, Sussex Co. and swamp west of Harding Lake, Sussex Co.

Chiogenes hispidula (L.) L. G.—Pine Swamp east of Sparta, Sussex Co.

Hottonia inflata Ell.—Swamp south of Green Pond, Morris Co., and Arcola, Bergen Co.

BOOK REVIEW

Flora of Southeastern Washington

Some eight years have passed since Dr. St. John left the State College of Washington, but a series of publications on the Pacific Northwest still gives evidence, not only of his continued interest in that region, but of the amount of data he must have accumulated during his nine years at Pullman. His most recent work[1] supplies us with not only a local manual and valuable notes on the plants of that area, but a careful study of the identity of these plants in relation to the rest of the flora of North America. He does not give the impression of thinking that he is saying the last word, even for the present, on the flora of the region; in many genera he describes, so far as they are known, but does not name, entities in groups needing further study. By so doing he will enable future students to pick up the thread where he has dropped it. In many cases, in addition to a simple citation of synonyms, he discusses the opinions of those with whom he may differ, and tells just how he has reached his conclusions. Again he will be thanked by those who wish not only to name an occasional specimen, but to study the relationships of the plants.

A frontispiece presents a map of the area, with life zones clearly shown in color. He steers a middle course between those who make a fetish of such life zones and those who consider them of little significance.

"Detailed studies have shown that few, even of the indicator, plants are absolutely constant to one life zone. If their entire geographic range is considered it is often found that they occur in two or more life zones. Also if a number of indicator species of one zone are studied and their ranges mapped in detail, it will be seen that their ranges do not exactly coincide. Hence, the life zones do not seem to be scientific concepts capable of precise definition. On the other hand they are generalizations of the mass association of plants characteristic of the great physiographic and climatic areas. They have a meaning and a

[1] Flora of southeastern Washington and adjacent Idaho. Harold St. John. Pp. i–xxv+1–531, map, figs. 1–11, 1937. Students Book Corporation, Pullman, Washington. Paper bound $3.20; cloth bound $3.70.

use. To the naturalist, the name Upper Sonoran brings an indelible picture of hot, arid plains or canyons with sagebrush, cactus, jack-rabbits, and horned toads. The name Canadian brings an image of deep, moist woods in the mountains, with the shade and fragrance of spruce, fir, and cedar. It is because of this value as a generalization that the life zone concept is used in this book. Whenever known the life zone is stated for each species. It is based on its occurrence within this area, and disregards its zonal occurrence elsewhere, which may or may not be identical" (pp. ix and x).

Genera and species are treated conservatively, but by no means "lumped." Seventy-five new names make their debut in this book, but we are given the impression that they are based on real study, not nomenclatorial juggling. The order of families follows Engler and Prantl because that system "seems the best" —whether best from the standpoint of representation of evolutionary lines, or from that of convenience and familiarity, is not stated.

The range within the area of each species is expressed in general terms for the commoner plants, and more exact locations and collectors of the localized forms are stated. The general ranges outside of southeastern Washington and adjacent Idaho are, unfortunately, omitted.

The keys are expressed in simple terms and appear workable. The key to families, always difficult to make and usually difficult to use, seems to be simplified as much as possible, and is partially illustrated by eleven text figures. These seem, for the most part, not very well chosen. It is doubtful if the beginner, unfamiliar with the distinctions between the Pteridophytes and the Spermatophytes, will derive much understanding from the drawings of spores (fig. 1). Again, the significance of fig. 3, showing "naked seeds," and fig. 4, showing "ovary and ovule," will scarcely be understandable except to one who already knows the difference between Gymnosperms and Angiosperms, and he will not need them. "Stamens opposite the petals" (fig. 7), and "stamens not opposite petals" (fig. 8) seem to call less for clarification by illustration than such characters as "ovary 1-celled with a central placenta," "placenta parietal," and "stamens hypogynous," with which we can all remember struggling.

In some groups classified mainly on fruit characters, notably

the Umbelliferae, keys to flowering, as well as fruiting, plants are supplied, thus removing one source of discouragement to many of those whose interest in botany revives with the spring. In *Antennaria* and *Salix* there are separate keys for staminate and pistillate plants.

Within each family the genera are arranged alphabetically, as are the species within each genus. While such procedure would be inexcusable in a taxonomic monograph, it may have its advantages in a manual, although the present writer, having worked in herbaria where species are arranged in alphabetic sequence, and in those where an attempt at natural order is made, must confess that he much prefers the latter.

N. C. Fassett

FIELD TRIPS OF THE CLUB

Joint Trip with the Southern Appalachian Botanical Club in Southern New Jersey, June 17–20, 1937

The Torrey Botanical Club met with the southern botanists at Pennsville, N. J., on Thursday morning, (June 17) for a week-end of investigation of the interesting southern New Jersey flora. Under the guidance of Dr. John M. Fogg, Jr., Assistant Professor of Botany and Curator of the Herbarium, University of Pennsylvania, the group drove to Salem, where a stop was made to observe the famous Charter oak, which was a large tree when the Friend's Burial Ground was established beneath it in 1676, and which has now attained a circumference, at six feet from the ground, of 27 feet 8 inches, and a height of over 80 feet, while the crown spread is about 120 feet. Following the brief stop here, the party motored to Elsinboro Point. In the afternoon the party went on to a point on a sandy beach four miles west of Hancock Bridge. Here Dr. Fogg and his party from the University of Pennsylvania left the group, Dr. John A. Small, Assistant Professor of Botany, New Jersey College for Women, becoming the leader for the remainder of the trip. At Parvin State Park, near Vineland, lodging had been arranged through the courtesy of J. J. Truncer, of the Park's staff.

Next morning the party struck northwards into the heart of the famous pine barrens, following U. S. Route 206, a splendid concrete highway, through a virtually uninhabited region. The first stop was made at Albertson Brook, in Atlantic County, where, in the bogs that adjoined the highway, Dr. Small and Dr. M. A. Chrysler, of Rutgers University, introduced novelties among pine barren endemics and their associates so rapidly that we were soon gasping for breath. Plants recorded here included *Ilex glabra*, *Magnolia virginiana*, *Chamaedaphne calyculata*, *Chamaecyparis thyoides*, *Rhododendron viscosum*, *Vaccinium corymbosum*, *V. macrocarpon*, *Lyonia mariana*, *Krigia virginica*, *Castalia odorata*, *Iris prismatica*, and various species of *Rynchospora*, *Cyperus*, *Eriocaulon*, and *Lycopodium*. Of special interest were three species of sundew, *Drosera rotundifolia*, *D. longifolia*, and *D. filiformis;* pyxie or flowering moss, *Pyxidanthera barbu-*

lata; Hudsonia ericoides; the sand myrtle, *Leiophyllum buxifolium;* the red-root, *Lachnanthes tinctoria;* and, in the drier places, the turkey-beard, *Xerophyllum asphodeloides.* Somewhat further along, at Atsion, we were given an opportunity to review some of these, while encountering still more novelties, including *Lobelia Canbyi, Arenaria caroliniana, Euphorbia ipecacuanha,* and *Rubus cunefolius.* Lunching on a side road near Atsion, we observed the drier phase of the barrens, beneath pines and oaks. After lunch a delightful drive along a narrow, sandy lane through an unbroken pine barren forest brought us to the neighborhood of Hampton Furnace, on the Batsto River. The name is reminiscent of the days when iron was obtained from rocks underlying the bogs, but the region is now virtually without human habitation. Here Dr. Small, having set our feet moving in the proper direction, allowed us to have the thrill of discovering for ourselves the climbing fern, *Lygodium palmatum,* entwined among the dense vegetation fringing the narrow river, and here we also first came upon the little plants that "eat bugs and ants and gnats and flies," members of the "new carnivora" —*Sarracenia purpurea.*

At Skits Branch, precariously treading upon the firmer clumps and clinging to bushes to keep from sinking beneath the muck, we felt we were truly "in the heart of the pine barrens," and especially after we had found *Narthecium americanum,* the bog asphodel, and *Lophiola aurea,* we felt that Witmer Stone's enthusiastic portrayal of the pine barrens, which Dr. Small read to us here, must have been prepared at this very spot.

Coming back upon a paved highway along the Pole Branch of Wading River, little colonies of curly grass, *Schizaea pusilla,* rewarded our search. Passing through Chatsworth, "the capital of the pine barrens," we came out upon New Jersey State Route 40, stopping by the roadside near Whiting to observe a clump of bear-berry, *Arctostaphylos Uva-ursi.* At Lakehurst we viewed from afar the wreckage of the Hindenburg, after which we proceeded via Lakewood to Bay Head and drove southwards in the evening to Seaside Park, where we studied the succession of vegetation on the dunes, from almost bare sand, dotted here and there by *Carex macrosperma* and *Artemisia Stelleriana,* to the pseudo-turf formed by *Hudsonia* and finally to a sparse

and youthful forest of oaks and pines. Crossing Barnegat Bay, we spent the night in a tourist camp south of Tom's River on United States Route 9.

On the 19th, an early morning stop at Forked River gave us another chance to observe several of the denizens of the bogs we had seen so often the preceding day and to add to the ever-mounting list of species of *Lycopodium*, *Drosera*, and *Utricularia*. At 11:00 A.M. we met, at the intersection of Route 4 and the Cedar Bridge road in Barnegat, a party from New Jersey and New York coming down for the week-end. The augmented party then struck westwards and was soon in the heart of The Plains, stopping occasionally on the summit of a slight elevation for a glimpse of the peculiar forest in which, as far as the eye could see in every direction, the trees, although apparently very old, did not greatly exceed an average of four feet in height. The day's itinerary led us through the great commercial cranberry producing areas and to Penn State Forest for lunch. After lunch the investigation of a most colorful bog near the ghost town of Martha led the party to acclaim Dr. Small as having "saved the best unto the last," and the crackling and flashing of a vigorous electric storm, accompanied by a torrential downpour of rain, provided a dramatic ceremony to signalize our farewell to the pine barrens. Through the rain and the heavy holiday traffic seaward-bound, we made our way southwards to Cape May for the night.

A visit in the evening to Otway Brown led to Mr. Brown's guiding us, on the morning of the 20th, to some of his favorite collecting grounds nearby, where we recorded an amazingly long list of grasses and sedges, and a few other novelties such as *Sclerolepis uniflora*, *Quercus phellos*, and *Linaria canadensis*. The party then officially broke up, the southern members starting their long drive homewards, the others spending the day more leisurely with stops at interesting spots as they traversed the lesser distances they were required to travel. Pleasant memories of the four-day tour led the author to trust that these intersectional visits may become traditional features of the two Clubs' annual field schedules.

An account of the first day of the trip by Dr. Fogg follows this.

EARL L. CORE

WEST VIRGINIA UNIVERSITY
MORGANTOWN

Trip of Thursday, June 17

The day was devoted to studying the flora of the eastern, or New Jersey, side of the Delaware River within the limits of Salem County. Particular attention was paid to the relatively high number of maritime species which, although here far from the open sea, occur commonly on the beaches and marshes of this county.

While waiting for the party to assemble at Pennsville, an unfamiliar *Rubus* was found growing luxuriantly on the sandy river banks near the wharf. This proved to be *R. ulmifolius*, a European species doubtless escaped from cultivation and not previously recorded from Salem County.

The first locality visited was Oakwood Beach, where *Lilaeopsis chinensis* (L.) Kuntze (*L. lineata* of the Manuals) was seen growing in great profusion and in full flower. Formerly considered rare in southern New Jersey, this curious umbellifer is now known to occur along many miles of the Delaware River shore where it is completely covered by brackish water at high tide. Other maritime plants detected at this station were *Spartina alternifolia*, var. *pilosa*, *Scirpus robustus*, *Acnida cannabina* and *Ptilimnium capillaceum*.

The next stop was at Elsinboro Point, where the party had the good fortune to discover a new locality for *Lophotocarpus spongiosus*. This species, which has only recently been restored to the flora of southern New Jersey (see Bartonia, No. 17, 1935), was here found profusely occupying a large tidal marsh along with *Peltandra virginica*. It was in full flower on this date, its white petals suggesting a *Sagittaria*, from which, however, its blunt sepals and thick, curved pedicels distinguish it.

On the sandy beach below Elsinboro Point were collected *Tripsacum dactyloides*, *Panicum amarum* and *Ammophila breviligulata*, all maritime species here at or near the inland limit of their ranges, so far as concerns the Delaware drainage.

The party then moved three miles down the river to a point near the mouth of Alloway Creek, some three miles west of Hancock's Bridge. Here, as might be expected (due to greater proximity to the mouth of the Bay), an even larger number of maritime species was encountered. In addition to the plants already seen at Oakwood Beach and Elsinboro Point, the broad sandy beach yielded *Spartina cynosuroides*, *S. patens*, *Atriplex*

patula, var. *hastata*, *Cakile edentula* and *Solidago sempervirens*, while on the open brackish meadows were found *Distichlis spicata*, *Setaria geniculata*, *Carex hormathodes*, *Cyperus ferax*, *C. filicinus*, *Juncus Gerardi*, *Baccharis halimifolia* and *Iva frutescens*.

Nearly all of these species, until a few years ago, were regarded as absent from or very rare in the Delaware drainage north of Cape May County. Recent study, however, has demonstrated that at favorable localities they may be found far up the Delaware River to the northern limits of Salem County.

John M. Fogg, Jr.

The Club's 1937 Trip to Quebec

Fifteen members and guests of the Torrey Botanical Club took part in its two weeks trip into northern Maine, the Shickshock Mountains of Gaspe, Quebec and the Laurentides National Forest north of the St. Lawrence River, from July 2 to 18, 1937. Our guides said it was the largest party that had ever entered the mountains, and it was undoubtedly the largest botanical group in the region since the Harvard expeditions under Professors Fernald and Collins several years before.

The party travelled in six automobiles, starting from scattered points in New York, New Jersey, Maine and Pennsylvania, and assembling Saturday evening, July 3, at Stratton, Me. On Sunday, July 4, we drove around via Dead River Valley, and climbed along the Appalachian Trail to the eastern summit of Mount Bigelow, at 4070 feet. The views of this group of mountains in Western Maine were splendid. The area above timber sustained a number of alpine plants, including *Arenaria groenlandica*, *Potentilla tridentata*, *Empetrum nigrum*, *Vaccinium uliginosum*, and *V. Vitis-Idaea*. The lemon yellow crustose lichen, *Rhizocarpon geographicum*, covered the summit ledges. *Cetrarias* were numerous, including *islandica*, *cucullata*, *nivalis* and *aculeata*. The writer found many robust *Clandoniae*, including the largest specimens of *C. elongata* he had ever seen.

On the following day the party proceeded to Greenville on Moosehead Lake, and followed a rough but interesting route via Ripogenus Dam on the West Branch of the Penobscot River, and between Mount Katahdin and Doubletop Mountain, past Baxter State Park, to Millinocket, spending that night at Houl-

ton. On the next day, July 6, we drove across New Brunswick to Matapedia and along the south side of Gaspe, to New Richmond. On the 7th, we entered the mountains, with a party of five guides, headed by the silent but competent Stillman Harrison. Our arrangements for camping, shelter and food had been efficiently made by Dudley Dimock, of New Richmond. We were particularly pleased with our cook, Earl Budd, an old army cook, whose good food, and good nature were among the high lights of the trip.

We drove in along the road on the east side of the Grand Cascapedia, which some of us had followed before, 49 miles to the Federal Lead and Zinc Mine, where we left the cars. Harrison had been in a few days ahead, with his men and horses and wagon and had established a camp for us on the south side of Tabletop Mountain, our objective for this part of the trip. In the afternoon, we walked in, somewhat wetted by a shower, to Lake St. Anne. Those of us who were there before, when we found it a lonely place, inhabited only by screeching loons, were surprised to find a party of French-Canadians building a large log cabin. Their boss proved to be M. Ernest Menard, Inspector-General of Fish and Game for the Quebec Department of Forests, and Superintendent of the new Gaspesia National Park, then being surveyed. He was building the cabin to be used first for the surveying party, and later as a rangers' cabin. He insisted on giving up his tent to the ladies of our party, as we were short one tent, others being at our base camp. He showed us the survey maps, indicating that the new Park will include Mount Albert, Tabletop, the Gorge of the St. Anne River, and Lakes St. Anne and Madeleine, about 250,000 acres. It will be a plant and animal sanctuary, intended, for one thing, to protect the caribou, the only herd south of the St. Lawrence. He was much pleased to see that we were using to identify plants, Professor Marie-Victorin's "Flore Laurentienne," and some of his separate monographs on various groups of plants. He told us that the Quebec Department of Education had given over 1000 copies of the "Flore" to students in secondary schools and colleges as prizes for proficiency in botany, and that his own daughter had won one of them. We also met an interesting person, Capt. Samuel Coté, who was the guide of Professors Fernald and Collins, on their Harvard expeditions years before and

of Professor A. P. Coleman of McGill University, authority on the glacial geology of the region, whose work we used on the trip. Capt. Coté proudly showed us letters of appreciation from all three scientists and was pleased that we knew of him.

Next day we followed the fire road toward Lake Madeleine, around the south and west slopes of Mount Sterling, to our camp on Fisher Branch of the River Madeleine, within sight of Tabletop. Along the road at several places, a new and handsome fern was *Phegopteris Robertiana*, with fronds somewhat like those of *P. dryopteris*, but stiffer and with smaller lateral pinnae. Another new plant was *Lonicera involucrata*, with large bracts. We also saw large colonies of the handsome foliose lichen, *Nephroma arcticum*, with disks large as nickels.

Our base camp was prettily located, and next morning, we started up Tabletop. Harrison, our head guide, had spotted a route part way but at the top of the climb he made the trail fresh before us, as fast as we wished to go, a novel experience of seeing a trail blazed and cleared before our eyes. He took us across the plateau and at length above the scrub spruce and fir to an open summit south of Mount Richardson, the highest summit on this part of the Tabletop Plateau. Interesting plants were *Lycopodium Selago* and *sabinaefolium; Phyllodoce caerulea*, as well as *Vacciniums, Empetrum, Ledum* and *Cassiope hypnoides*. For those of us who were on Mount Albert the year before, it was interesting to note that some plants which evidently prefer the serpentine rocks of that summit do not like the granite of Tabletop, such as *Lychnis alpina*, *Statice labradorica*, var. *submutica*, and *Adiantum pedatum*, var. *aleuticum*, none of which we found in the vicinity of Mount Richardson. However the lichen *Rhizocarpon geographicum*, characteristic of northern mountain tops, which we looked for in vain on Mount Albert's serpentine ledges in 1936 was plentiful on the Tabletop granite.

On the way out we climbed over Sterling Mountain, on which *Cladoniae*, especially gorgeously scarlet fruited *Cladonia pleurota*, f. *coronata*, were numerous. The views were grand, with the snowfields on Mount Albert gleaming in the north. At one point the road had been carried away for a hundred yards by a slide, and there our guides had to unhitch the horses, lead them gently across the narrow spot, take the wagon apart and carry it across in pieces and put it together again on the other side, gather up our duffel and go on.

We then drove out to the south side highway, spent a night comfortably at the Five Oaks, Shigewake, getting hot baths to clean off the woods dirt. Next day we gave the bird lovers a treat by visiting the sanctuary on Bonaventure Island, a sight that no one visiting Gaspe should miss. Continuing on around the point of the peninsula, spending a night at Fox River, we spent an easy going day westward along the north shore cliffs, where interesting plants were the Butterwort, *Pinguicula vulgaris*, with its pretty violet flowers and greasy leaves, the delicate fern, *Cryptogramma Stelleri*, *Plantago juncoides* and others.

After spending the night at Rimouski, we put in the next morning visiting the marine biological laboratory of the University of Laval, Quebec, at Trois Pistoles where the staff, clergy and lay, entertained us hospitably. On the way to the ferry at Riviere du Loup, we made a detour, at the suggestion of Frere Marie-Victorin, to Gros Cacouna, a rocky knob once an island in the St. Lawrence, to find *Cornus suecica*, differing from the common *C. canadensis*, in possessing two to four whorls of leaves, instead of only one.

Crossing to Tadoussac, where the writer found many unusual *Cladoniae*, the party took the boat up the famous Saguenay, and after a cloudy, umpromising evening, the sun broke through and gave us one of the most magnificent sunsets the crew of the fine steamer *Quebec* ever recalled. The steep granite walls of this river suggested that they must be sanctuaries for many plants. Next day, after a night at Chicoutimi, we visited the outlet of Lake St. Jean, and then struck south through the Laurentides National Park to Quebec. This route will be worthy of more attention another time, for it looks interesting botanically everywhere and, when the road improvements are done, it will be more comfortably accessible for American tourists. *Cladoniae*, over the areas once burned and now growing up again, were marvellously robust and dense. A common plant in the swamps was the Baked Apple Berry, *Rubus Chamaemorus*.

We spent the next day sight-seeing in Quebec. Some visited the Provincial Museum where they found a good herbarium. Then we went on into Vermont stopping to drive up Mount Mansfield to look again at alpine plants; to pay a visit to Dr. Will S. Monroe, and his great dogs at Couching Lion Farm, and then on our various ways.

Raymond H. Torrey

PROCEEDINGS OF THE CLUB

Meeting of March 17, 1937

President Barnhart called the meeting to order at 3:30 P.M. at the New York Botanical Garden. Twenty persons were present. The minutes of the last two meetings were read and accepted.

The resignations of Dr. Kingo Miyabe, Hokkaido Imperial University, Sapporo, Japan, and of Dr. Vladimir A. Shternov, New York City, were accepted with regret. The recording secretary reported that a letter of resignation had been received from Mr. Arthur Norton, and that Miss Eleanor A. Friend wished to resign from annual membership and apply for associate membership.

The applications of Mr. Lyman Benson, Mr. Cyril O. Bratley, Dr. W. R. Ivimey-Cook, and Mrs. Frank G. Ruggles for annual membership were read.

In view of the fact that the club has at present no honorary members, Dr. Moldenke proposed that Miss Gulielma Lister of Leytonstone, Sussex, England, be considered for this honor. He stated that Miss Lister is a "member of a family of naturalists and scientists, world renowned as an expert on the Myxomycetes. She is the niece of the great Joseph, Lord Lister, and daughter of the famous Arthur Lister. She is one of the last of that fast-disappearing class of all-around naturalists which reached its most splendid culmination in Charles Darwin, whose student and friend she was."

The recording secretary read a letter from Miss Gertrude D. Howe, daughter of Dr. Marshall Avery Howe, acknowledging the club's appreciation of her father. A letter was received from Prof. William L. Bray of Syracuse University thanking the club for his election to Honorary Life Membership.

Dr. Fulling proposed that the afternoon meetings of the club be held at 3:00 P.M. rather than at 3:30. There was some discussion of this proposal but no action was taken.

For the scientific program, Dr. Ralph H. Cheney of the Biology Department of Long Island University gave a very comprehensive talk on the "Morphology and Chemistry of the

Coffee Fruit in Relation to Beverage Quality and Effects." The quality of the beverage is dependent upon fruit size, seed size, and the altitude at which the coffee trees are grown. A height of about 5 meters and a fruit size of .8–.9 cm. are necessary conditions for the production of the best coffee. Coffee seeds of a fine hard structure containing from 1–2% caffein are also best. *Coffea arabica* has been found to possess the greatest number of desirable qualities and is very widely cultivated, the production areas of coffee in general following the equator.

Dr. Cheney then showed some very interest charts demonstrating the effect of coffee and caffein on various physiological processes of animals and man. It was shown that the stimulatory effect of coffee is not entirely due to caffein.

D. Elizabeth Marcy
Recording Secretary

Meeting of April 6, 1937

The meeting, at the Museum of Natural History, was called to order at 8:15 p.m. by President Barnhart. Forty five persons were present.

Dr. John W. Shive, Plant Physiologist at the New Jersey Agricultural Experiment Station, was the speaker of the evening, and the subject of his address, "Cryptotrophic Nutrition of Plants." Dr. Shive stated that he preferred the word "trace element" to "cryptotrophic" and explained that, although very small doses of certain elements were necessary for nutrition, the importance of these elements was in no sense minor. Many so-called "physiological diseases" are due to a lack of one or another of them. His first slide showed the characteristic symptoms of deficiencies of potassium, calcium, boron, magnesium, iron, manganese, and phosphorus.

The effects of boron deficiency were discussed in detail. Deficiency symptoms appear one week to ten days after the boron has been omitted from the culture solution. The chief injury is to the meristematic tissues. The entire growing tip is killed and further growth prevented. If boron is then supplied, new shoots may start from the base of the plant. The leaves of boron deficient plants have a wrinkled appearance and characteristic breaks or cracks in the midrib. The disease "cracked

stem" in celery has been demonstrated to be due to boron deficiency.

Microscopic examination of boron deficient plants indicates that the meristematic cells enlarge, become more acid, and finally explode. This disintegration follows back through the cambium and finally affects all of the vascular tissues. Chemical analysis shows that there is an accumulation of ammonia in boron deficient plants. The percentage of soluble nitrogen compounds is greater in boron deficient than in normal plants, but the percentage of protein nitrogen less.

One-half part per million of boron is enough to satisfy the nutritive requirements of the dicotyledonous plants tested and five parts per million is definitely toxic. However, the boron requirements of various kinds of plants differ. The monocotyledons in general seem to have a very low boron requirement, cotton requiring twice as much boron as corn. Experiments have shown that plants are not able to store boron.

D. Elizabeth Marcy
Recording Secretary

Meeting of April 21, 1937

The meeting was called to order by President Barnhart at the Brooklyn Botanic Garden at 3:30 p.m. Eighteen persons were present.

The minutes of the last two meetings were read and approved. The recording secretary stated that she had received the application of Mr. Edgar B. Harger for annual membership, and the applications of Mrs. Robert C. Hill, Miss Marion K. Ober, and Mrs. Stephen R. Smith for associate membership. It was reported that letters of resignation had been received from Mr. C. M. Roberts and Mr. Rodney B. Miller.

In response to the Club's petition that the area proposed for Mt. Olympus National Park not be reduced, a letter was received from Mr. Arno B. Cammerer of the Department of the Interior. He stated that the bill for the proposed park had been defeated but that a new bill (H.R. 4724) has been introduced which provides for a much smaller park area but with adequate examples of the primeval forest of the Olympic Peninsula.

"Inheritance studies on disease resistance in sorghum" were discussed by Dr. Elizabeth Marcy of the Brooklyn Botanic

Garden. In recent years sorghums have become an important crop in this country, particularly in the southwest, because of their ability to withstand drought conditions. There are three important sorghum diseases: the head smut, *Sorosporium reilianum*, the covered kernel smut, *Sphacelotheca sorghi*, and the loose kernel smut, *Sphacelotheca cruenta*. Infection usually takes place in the early seedling stage, but spores are not formed until the plant is mature. External environal conditions during the germination period have a pronounced influence upon the percentage of smutted plants. Environal conditions very favorable for the infection of susceptible varieties failed to cause infection of the resistant milo varieties, but caused certain pathological symptoms of infection in the resistant variety, Feterita.

When the reaction of the hybrids to the covered smut was determined it was found that a clear-cut 3:1 ratio of resistant to susceptible F_2 plants was obtained in crosses between milo and susceptible varieties. When Feterita was crossed with susceptible varieties there were indications of the interaction of two factors, a 13:3 ratio of susceptible to resistant F_2 plants being obtained. Crosses between milo and Feterita showed that they possessed different factors for resistance.

Reaction of these hybrids to the loose smut was quite different, susceptibility being dominant in the milo hybrids, and resistance dominant in the Feterita hybrids.

D. Elizabeth Marcy
Recording Secretary

Meeting of May 4, 1937

The meeting was called to order at 8:15 p.m. at the American Museum of Natural History, President Barnhart presiding. There were fifty members and friends present.

Dr. George C. Wood, 4430 Tibbett Ave., Riverdale-on-Hudson, New York City was elected an annual member.

The following were elected associates: Mr. Leon W. Bowen, 77 Evergreen Ave., Bloomfield, N.J.; Mr. John A. Crabtree, Montgomery, N.Y.; Miss Clara Raska, 21-14 149 St., Whitestone, L.I., N.Y.

Also those whose applications for membership were reported at the meetings of March 17 and April 21 were elected.

Professor A. W. Evans of Yale University, a member of the

club since 1896, was unanimously elected to Honorary Life Membership.

The resignations of the following from annual membership were accepted with regret: Mr. Leon W. Bowen, Bloomfield, N.J.; Miss Eleanor A. Friend, N.Y. City.; Mr. R. B. Miller, Newark, N.J.; Mr. Arthur Norton, Portland, Me.; Mr. C. M. Roberts, Fairmont State Teachers' College, Fairmont, W.Va.

Dr. A. B. Stout of the New York Botanical Garden was the speaker of the evening. His discussion of "Incompatibilities in Flowering Plants" was amply illustrated with carefully worked out charts. Dr. Stout stated that the term incompatibility, as he uses it, applies to plants within a species and results from too great similarity in genetic makeup, in contrast to hybridization incompatibility which results from too great dissimilarity in genetic makeup.

Plants within a species may be self incompatible and cross compatible or vice versa, with many gradations in between. By making a large number of crosses, he showed how it has been possible to divide species into separate lines or strains on the basis of the cross compatability within the group. He outlined studies on Veronica where only four such lines have been found to be present, and studies on petunia where a larger number of lines have been discovered, and between which the compatability relationships are much more complex.

In closing he mentioned the economic importance of this type of investigation, and showed the results of testing the compatability relations of a large number of fruit trees.

D. Elizabeth Marcy
Recording Secretary

NEWS NOTES

Dr. William J. Robbins, dean of the Graduate School of the University of Missouri has been appointed Director of The New York Botanical Garden. Some of his outstanding work has been with the isoelectric point of plant tissues, with growth of exercised root tips and with plant auxins. The General Botany of which he is co-author, is one of our best balanced and generally useful botany texts. An able and energetic plant physiologist, he brings to the Botanical Garden a broad outlook on modern developments in the botany of living plants.

There has recently been established the Organ Pipe Cactus National Monument in Arizona. The cacti for which the park was named form its chief attraction. These cacti are large, growing in erect clumps, branching only from the base, and suggesting in form the pipes of an organ. The Indians of the Papago Reservation visit the region to gather the fruit which ripen in late June.

Mr. John E. Lager, collector and commercial grower of orchids, died at his home in Summit, N.J., on October 30, in his seventy sixth year. Born in Sweden he worked in botanical gardens in London and Paris before coming to this country. He made several trips to South America to hunt orchids in the mountains and brought back some forms never before collected.

As was noted in our issue of January–February, the Natural Science Museum at Syracuse University was partly destroyed by fire last January. The museum is now being rebuilt and will probably be completed by the 1st of February. Dr. Ernest D. Reed, leader of two South American expeditions, is at the head of the museum board, and is directing the work.

On November 23 Sir Jagadis Chunder Bose died in Calcutta, India. Dr. Bose at the time of his death was director of the Bose Research Institute in Calcutta which he established in 1915. The work for which he was best known had to do with responses of plants to stimuli, such as bad air, touch, poisons, drugs, in

fact to almost every stimulus to which animals respond, except sound. He developed extremely sensitive apparatus to measure the responses made by plants to these stimuli. He maintained there was no animal reaction in even the highest animal form that had not been foreshadowed in the lives of plants. He also taught that plants have a nervous system and something corresponding to a heart. In this country the accuracy of his work is not questioned, but his interpretations, are, many of them, considered the views of a mystic.

One of our members would like to know if anyone can give the scientific names of plants referred to as "Wild Isaac" and "Narrow-leaved wild Isaac." These names were used in describing the plants growing in a wild garden in the Town of Litchfield, Conn.

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3, May–June	June 15
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6, November–December	December 29

In *Science* for December 17 Dr. Aleš Hrdlička describes briefly the peculiar growth of plants found on the ancient village sites in Alaska and the Alaskan Islands. In practically every case the plants growing on the sites of ancient villages and on kitchen middens are so distinct from the surrounding vegetation that these sites can be recognized at a distance merely by the plants growing on them. In general the vegetation is much darker and richer than in the surrounding regions. For example, one pre-Russian village site is covered every year with for-get-me-nots, the only ones seen in the neighborhood.

Dr. F. Lamson-Scribner, who retired as agrostologist of the U. S. Department of Agriculture in 1922, recently received a visit from D. E. Juan, a native of the Philippine Islands, to express the sentiment of the farmers of the Philippine Islands. As their first director of agriculture, Dr. Lamson-Scribner, now

eighty-six years old, introduced into the islands more than thirty-five years ago modern methods of soil tilling and crop harvesting. He was responsible for the establishment of experimental stations throughout the islands. Mr. Juan presented to Dr. Lamson-Scribner a testimonial with the inscription "The Filipino farmers owe you a debt of gratitude." (Science)

Dr. Oscar M. Ball, for thirty-four years professor and head of the department of biology of the Agricultural and Mechanical College of Texas, has retired from active teaching with the title professor emeritus. He will devote his entire time, as curator of the college museum, to his collections of fossil plants, and to the fossil vertebrata assembled by the late Dr. Mark Francis. (Science)

The departments of botany of Cornell University and the University of Chicago have arranged an exchange of instructors for the winter quarter of the current academic year. Dr. R. A. Laubengayer, of Cornell, and Dr. Paul D. Voth, of Chicago, have been selected for the exchange. Both instructors will be engaged in the teaching of general botany in the large elementary courses. (Science)

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